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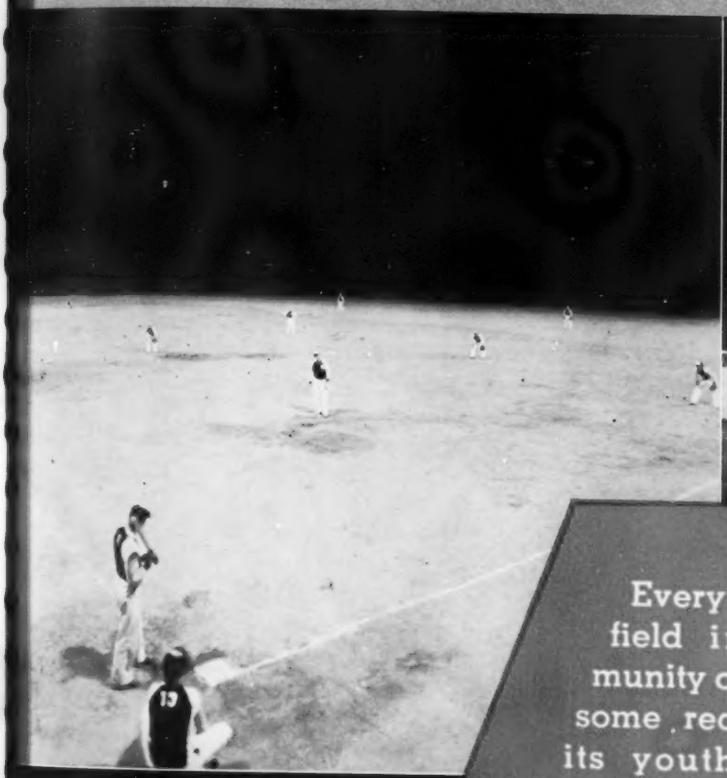
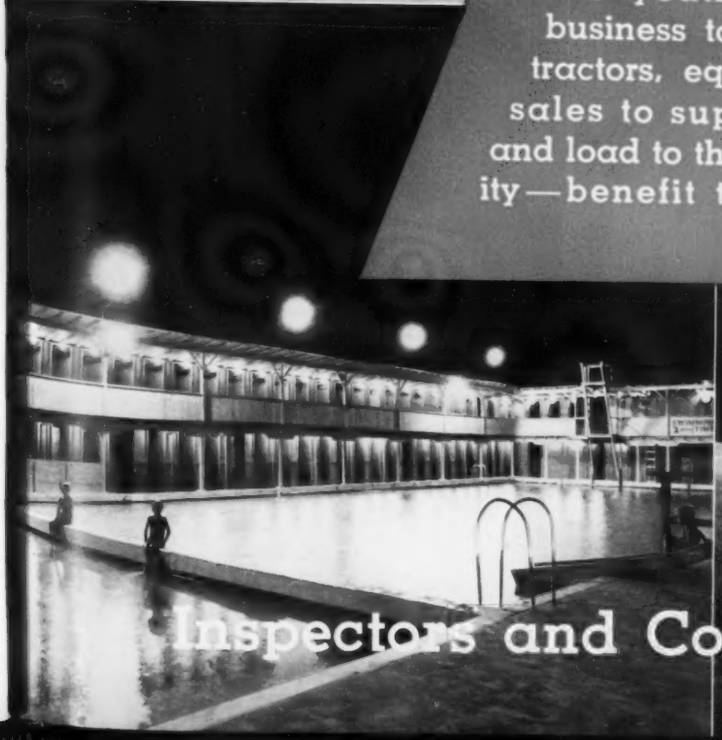
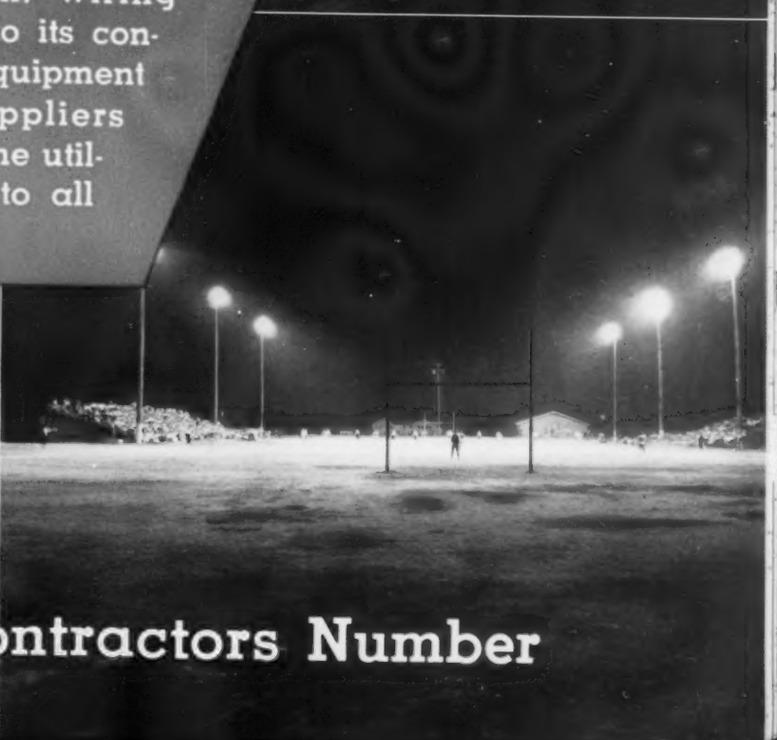
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



Every lighted playfield in the community offers wholesome recreation to its youth, wiring business to its contractors, equipment sales to suppliers and load to the utility—benefit to all





Inspectors and Contractors Number

Preparing for the Next Big Market

★ With less than 10% saturation, electric ranges offer the next big market for appliance dealers. Edison advertising has anticipated this trend by concentrating on range promotion throughout 1937. The result of this concentrated effort has been apparent in the steady month-by-month increase in electric range sales which, at the present time, are at the highest levels in history.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Every Week
1/2 MILLION MEALS are prepared every day on Electric RANGES (In This Territory Alone)
Time to get yours
Every 10TH HOME in Edison Territory now cooks on an Electric RANGE
Time to get yours
53 THOUSAND HOMES in Southern and Central California will cook Tonight's Dinner on an Electric RANGE
Get yours NOW!
keep cool THIS SUMMER WITH A MODERN ELECTRIC RANGE
get yours NOW
You and your kitchen stay cool WHEN YOU COOK ON AN ELECTRIC RANGE
get yours NOW
it costs surprisingly little TO COOK ON A MODERN ELECTRIC RANGE
Go Electric NOW
AN ELECTRIC RANGE costs no more TO BUY OR OPERATE
Go Electric NOW
SEE YOUR DEALER
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

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ELECTRICAL WEST

WITH WHICH ARE CONSOLIDATED THE "ELECTRICAL JOURNAL," THE "JOURNAL OF ELECTRICITY, POWER & GAS," AND THE "JOURNAL OF ELECTRICITY"

ESTABLISHED 1887

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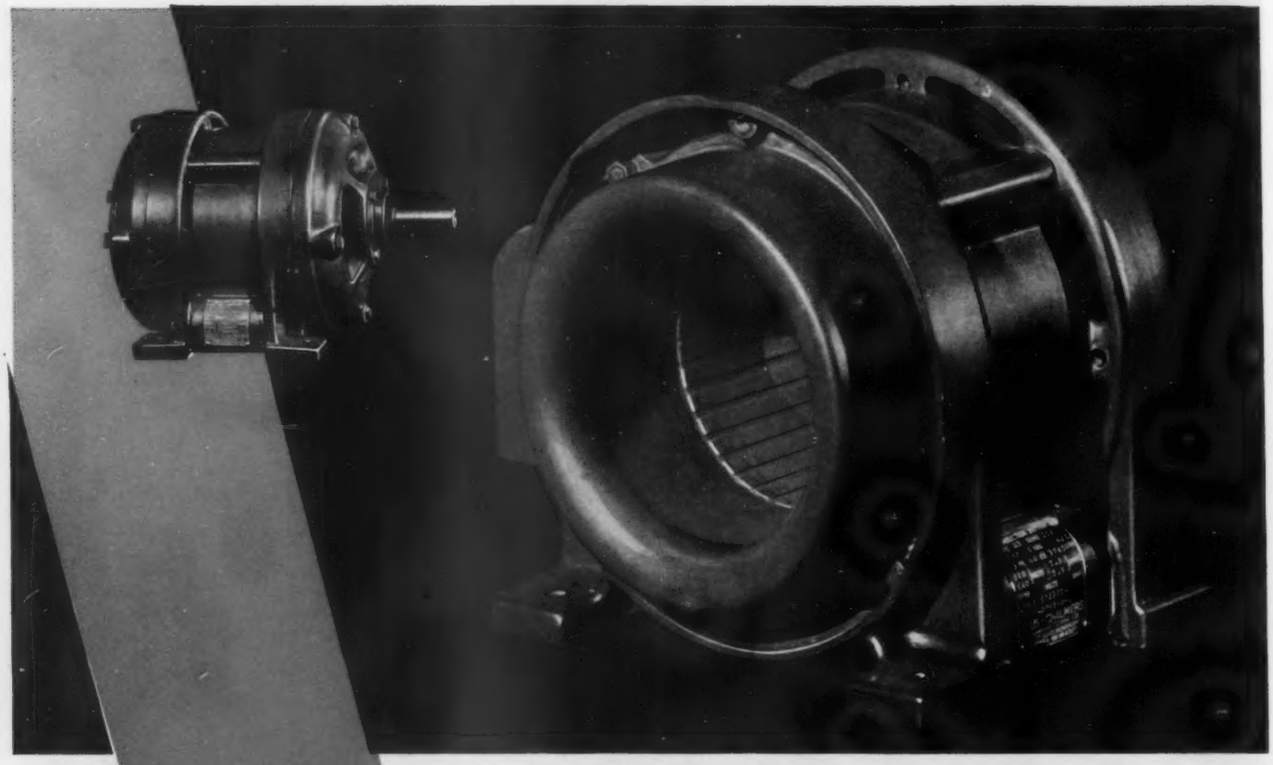
NEXT MONTH

In September, Electrical West will publish its annual Appliance Sales Guide. Covering the entire appliance merchandising field, this invaluable reference for salesmen, sales and promotion managers will add to the enduring principles of selling, successful new techniques developed in the field throughout the year. It will supplement a fully departmentalized issue.



INVULNERABLE

First of all a motor must be sturdily constructed . . . and Allis-Chalmers Motors are the sturdiest motors on the market—bar none.

But all the sturdiness of the sturdiest motor is of no avail if its vital parts are vulnerable.

Allis-Chalmers Seal-Clad Motors are invulnerable to the attacks of metallic dust, grit, oil, moisture, chemicals and other such destructive agents, one or more of which are present in every plant to a greater or lesser degree.

The windings of Allis-Chalmers Seal-Clad Motors are provided with the ultimate protection.

The wound stator of this motor receives an impregnating treatment similar to that given the conventional type of winding . . . AND THEN a Moulded Bakelite Shield, of high dielectric and mechanical strength, is fitted into a machined slot in the stator frame and tightly sealed into position with a special compound. Thus the coils are protected by hard, smooth shields that are impervious to damaging agents.

For further details, write today for Leaflet No. 2182.

The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 hp. up—also motors for special application.

MOTOR DIVISION

ALLIS•CHALMERS

MILWAUKEE WISCONSIN

SERVICE Entrance and Drop Cables made by the American Steel & Wire Company have been designed to reduce the cost of service change-overs involved in the installation of ranges and other appliances in homes, and to eliminate current diversion.

Our "Tamperproof" types have a concentric bare neutral conductor applied over the insulated conductors which makes it difficult to divert current without causing a short circuit between the inner and outer conductors when the cable is cut. The "Tamperproof" types (SD and SE) are approved by Underwriters for circuits not exceeding 150 volts to ground.

Type ASE is designed primarily for use under conditions where the Code calls for an entrance cable of the "protected" type. Type USE, for underground entrances, can be buried direct in earth without ducts or other external protection. Type ASE is also approved for this same purpose.

For full information on our Service Entrance and Drop Cables write for Bulletins No. 102 and 104.

SERVICE ENTRANCE *and* DROP CABLES

COLUMBIA STEEL COMPANY · *San Francisco*

Pacific Coast Distributors of products manufactured by the American Steel & Wire Company

United States Steel Products Company, New York
Export Distributors

UNITED STATES STEEL

Modern Testing Facilities assure the *High Quality* OF ROEBLING POWER CABLES

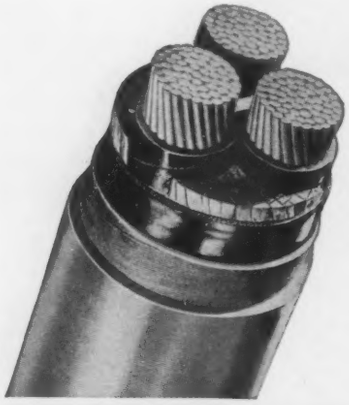
THESE huge transformers... with an ultimate capacity of 400,000 volts... play an important part in the complete Roebling test program. They stand as a symbol of the ceaseless checking and testing that go on at Roebling to maintain the high standard of Roebling Power Cables.

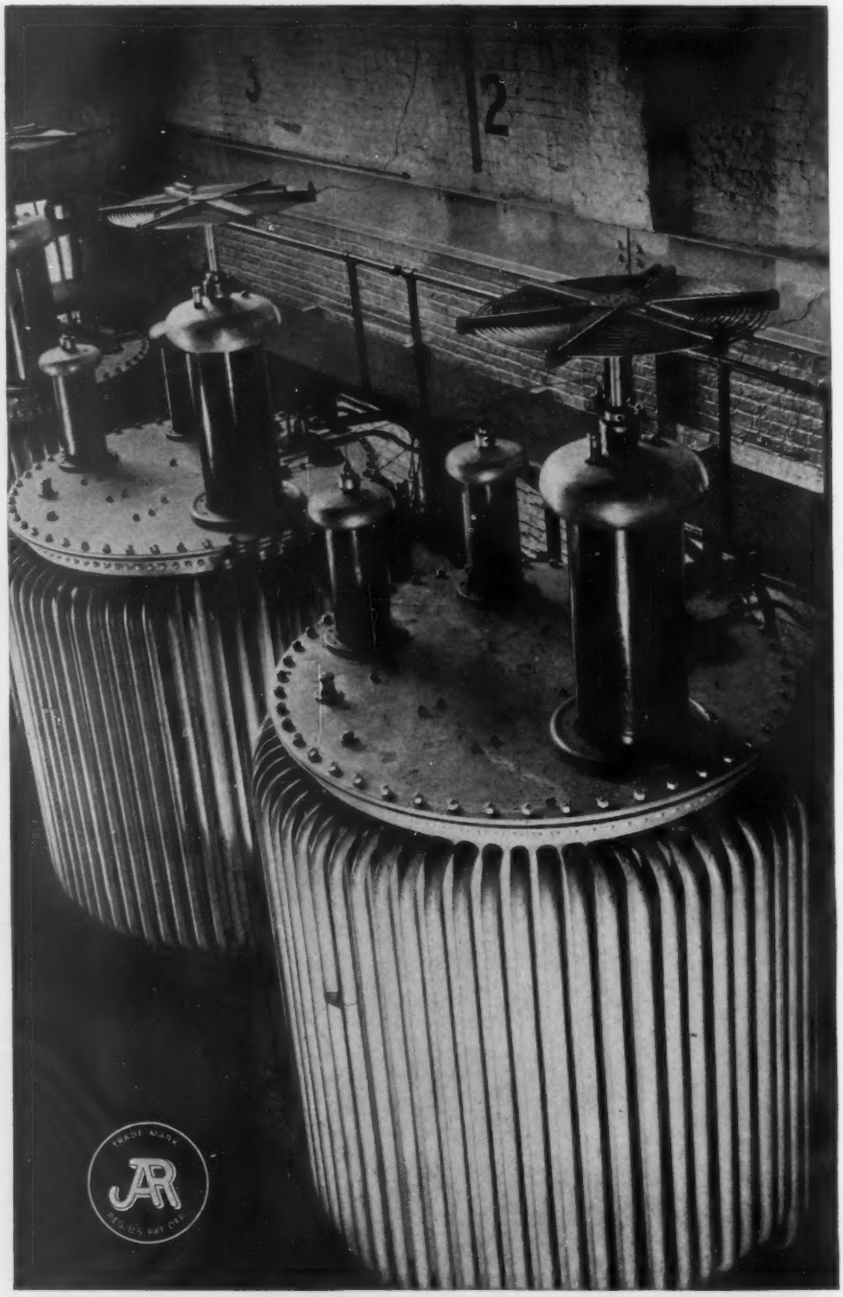
There are over 60 other types of Roebling Wires and Cables ranging from hair fine magnet wire to heavy power transmission cable. We would welcome your inquiry for further information and prices.

Roebling Varnished Cloth Cable...

is available in single, two and three conductor types; for a wide range of voltages; in all commercial sizes. Braided or leaded. Also with steel, zinc, or bronze tape, or round wire steel armor.

JOHN A. ROEBLING'S SONS CO., OF CALIF.
San Francisco Seattle Los Angeles Portland





ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

THERE ARE

Decided Economies

EFFECTED BY INSTALLATION OF LOW COST...

Trip-O-Link Switches may be mounted on pole, crossarm, or directly on the transformer

TRIP-O-LINK *FUSE* SWITCHES

Note the

FEATURES OF THE TRIP-O-LINK

RESILIENT SUSPENSION MEMBER — made of Copperweld high strength spring rod; cushions short circuit impact.

POINT PRESSURE CONTACT — produces a pressure of approximately thirty pounds on the fuse body.

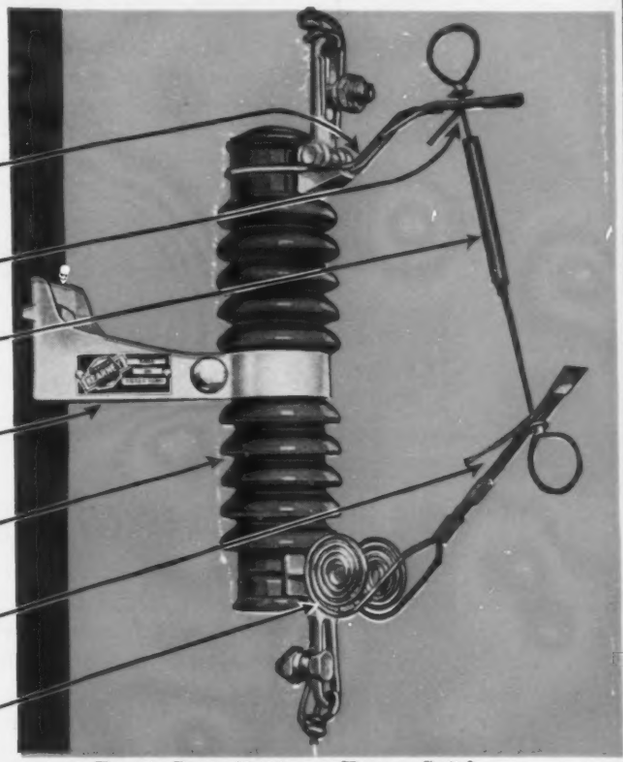
COMBINATION FUSE UNIT — combines conventional fuse cartridge with the fuse into a small, compact unit with high interrupting capacity.

ONE-PIECE HANGER — adaptable to either pole or crossarm mountings and permits swiveling of the insulator.

ONE-PIECE TUBULAR INSULATOR — made of extruded wet process porcelain.

DOUBLE POINT PRESSURE CONTACT — permits inspection of fuse in use without interruption of service, and right or left hand installation.

LOWER CONTACT SPRING — produces quick separation of arcing terminals when the fuse blows.



FURTHER DATA *Turn to Pages 19–26, new Kearney Switch Bulletin 312, and see the wide adaptability of this new and unique line of switches.*

SOLDERLESS CON-NEC-TITES.
T-CON-NEC-TITES.
LAP TITE CONNECTORS.
TRIP OUT FUSE SWITCHES.
TRIP O-LINK FUSE SWITCHES.
TRIP-SAVER FUSE SWITCHES.
ONE AND TWO INSULATOR FUSE AND DISCONNECT SWITCHES.
PORCELAIN HOUSED TRIPOMATIC FUSE CUTOUTS.
DOUBLE DUTY FUSE CUTOUTS.
POLE TOP GANG OPERATED SWITCHES.
PORCELAIN HOUSED DISCONNECT SWITCHES.
N.E.M.A. HOOK OPERATED DISCONNECT SWITCHES.
FUSE LINKS.
FUSE LINK BOXES.
FUSE PULLERS.
SECONDARY FUSES.
SCREW ANCHORS.
EXPANSION ANCHORS.
FULL-YU GUY GUARDS.
GUY WIRE CLIPS AND STRAND BANDS.
ECONOMY CABLE CLAMPS.
DEAD-END SERVICE CLAMPS.
V-GROOVE SERVICE CLAMPS.
HITEMETERS.
"J" HOOKS.
CONDUIT STRAPS.
A.B.C. SLEEVES AND MACHINES.
CABLE RING SADDLES.
FIT-RITE WIRE HOLDERS.
SLEEVE TWISTERS.
GROUND WIRE CLIPS.
GROUND CLAMP-TITES.
GROUNDING CABLE.
HI-LINE TOOLS AND ACCESSORIES.
CON-NEC-TAP CLAMPS.
GROUNDING SETS.
MASTERENCHES

KEARNEY PRODUCTS

MAYDWELL AND HARTZELL
INCORPORATED
LOS ANGELES SAN FRANCISCO

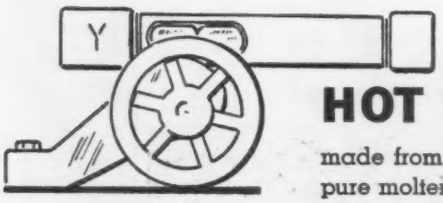
BIG PROFIT GUNS

Let these Shoot Down Your Costs

If you have considered that conduit is just a price proposition, there's a pleasant surprise waiting for you in Buckeye Conduit.

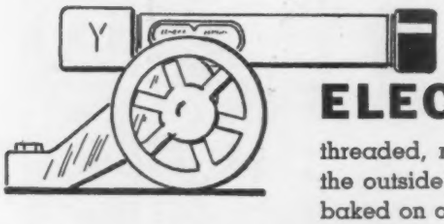
Find out for yourself how the correct combination of ductility and strength will let you set a bend quickly yet never throw a flat in the radius. Find out the speed that comes with clean chased and well protected threads. Find out how that smooth oven baked lacquer lining will let you push through many places where you should be snaking.

Ask for Buckeye by name, and get set for more speed and a better profit.



HOT GALVANIZED

made from selected pipe thoroughly pickled and cleaned. Galvanized in pure molten zinc, and specially processed for smoothness of coating, inside and out. Finally a tough coating of transparent enamel is baked on both inside and outside.



ELECTRO-GALVANIZED

threaded, reamed, inspected and cleaned, this conduit is galvanized on the outside only. The interior is coated with a tough elastic black enamel, baked on of course, but exceptionally flexible. Finally, transparent enamel is applied both inside and out.

BLACK ENAMELED

The same careful selection of pipe steel precedes this fabrication. The enamel is applied by dipping and is air set before baking. Oven control is accurately maintained by pyrometers to insure a high lustre tight coat that will be both tough and elastic.

BUCKEYE TRADE MARK YOUNGSTOWN CONDUIT

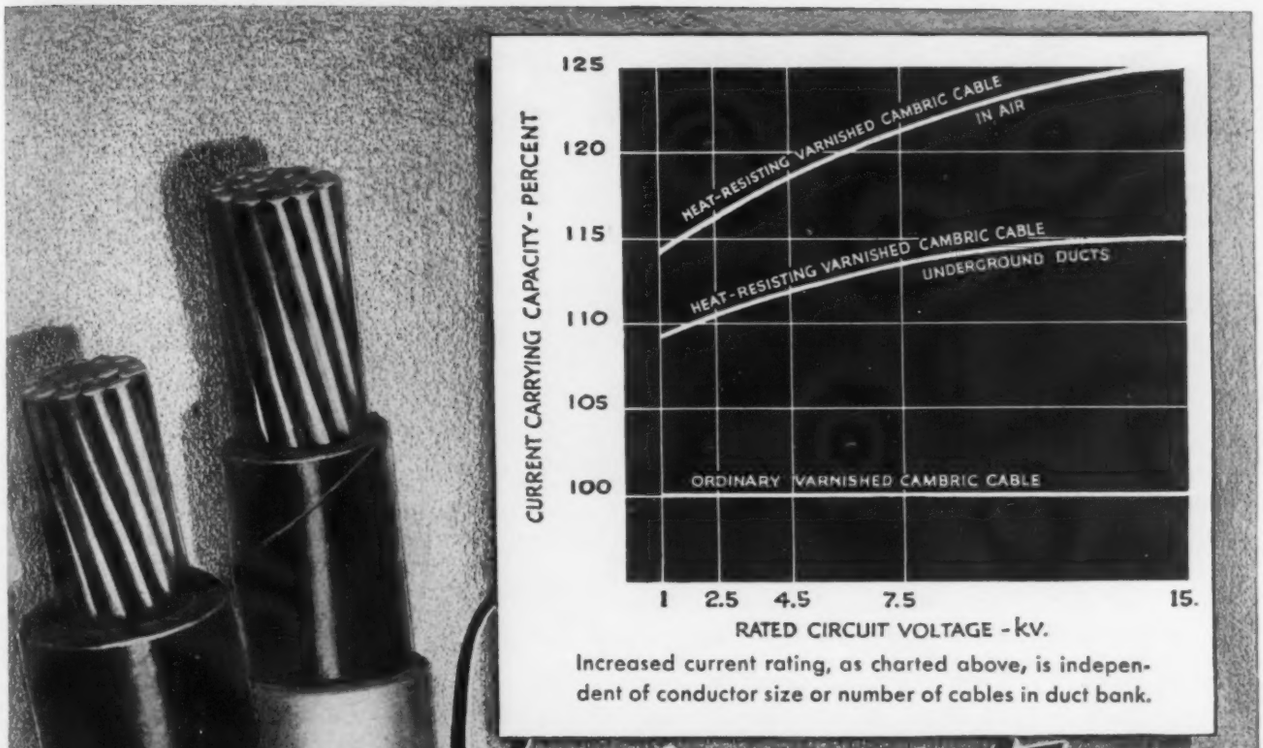
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels • General Offices: Youngstown, Ohio

CONDUIT • PIPE AND TUBULAR PRODUCTS • SHEETS • PLATES • TIN PLATE
BARS • RODS • WIRE • NAILS • UNIONS • TIE PLATES AND SPIKES

26-3

YOUNGSTOWN



Increased current rating, as charted above, is independent of conductor size or number of cables in duct bank.

heat-resisting VC

GENERAL CABLE'S NEW HEAT-RESISTING VARNISHED CAMBRIC CABLE AFFORDS NEW ECONOMY FOR GENERATOR LEADS AND STATION CABLES

THE GENERAL CABLE HEAT-RESISTING VARNISHED CAMBRIC CABLE FOR CONTINUOUS HEAVY LOADING . . .

You can operate with the same maximum allowable conductor temperature as for paper cable which is 10 to 15° C. higher than for ordinary V.C. Cable . . . . Compared to ordinary Varnished Cambric Cable you can:

1 Use a smaller conductor for same current.

2 Increase current for a given size conductor.

3 Have longer cable life at high ambient temperatures.

4 Have lower cost per Kv-a.

GENERAL CABLE CORPORATION

Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES
NEW YORK • PHILADELPHIA • PITTSBURGH • ROME • SAN FRANCISCO • ST. LOUIS • SEATTLE • WASHINGTON, D. C.

OKOSHEATH

A NON-METALLIC SHEATHED CABLE

Note Its Simplicity

Just a tough rubber belt around the conductor. That is Okosheath. Simple in design—but it *lasts.*

There is nothing to deteriorate and rot away. Enormous quantities of Okosheath, used both in conduit and buried directly in the ground, have demonstrated its durability. The Okosheath Service Record: *No complaints, no failures.*

Okosheath is effectually moisture resistant. It is clean, smooth, flexible, light in weight, small in diameter; easy to handle and install. A lineman can splice it. Tough and compact, Okosheath is just the cable for the tough pulls.

Okosheath opens the way for the new trends and demands. Besides lower first cost, it saves in maintenance. The dollar benefits are *both* ways.

THE OKONITE COMPANY
Founded 1878
and
HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE COMPANY, INC.

EXECUTIVE OFFICE: PASSAIC, N. J.

New York · Boston · Chicago · Detroit
Philadelphia · Pittsburgh · Washington · San Francisco
Los Angeles · Seattle · Buffalo · St. Louis · Dallas · Atlanta
Factories: Passaic, N. J. · Wilkes-Barre, Pa. · Paterson, N.J.

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

A PRODUCT OF RESEARCH . . . another high spot in

TODAY'S TREND TOWARD

POWER INSULATORS

PYREX is a Trade Mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

Removable Block!

Easier to Install!

Cuts Installation Time!

Reversible Block!

The NEW 7RL4 COLT-NOARK Service Switches

with Removable Reversible Block

The whole idea back of these new Colt-Noark Pull-out Switches is . . . speed and ease of installation. The block is built in one complete unit . . . and out it comes by simply loosening *a single screw!* The cuts at the left show how simple it is to wire the new 7RL4. First a single screw is loosened . . . and you can't lose it because it is fitted with a special collar washer. Then lift out the block . . . and you have an absolutely empty box, with plenty of room for bringing in your wires. With the wiring complete . . . slide the block back into place . . . make your connections and the job is done.

BLOCK IS REVERSIBLE

A feature of the new 7RL4 is the reversibility of the block so that lighting circuits can be connected at the top—often necessary to facilitate wiring and save money. Speed up installations . . . cut down installation costs . . . make sure of a better job . . . and boost your profits by pushing these new 7RL4 pull-out switches.

All fuses are accessible through an auxiliary door. Cabinets are furnished for either surface or flush mounting.

Fuse holders may be retained in "off" position by inverting. When inverted, switch blades will not make contact.

H. B. SQUIRES CO., Pacific Coast Representative

COLT'S PATENT FIRE ARMS MFG. CO., Electrical Division HARTFORD, CONN.

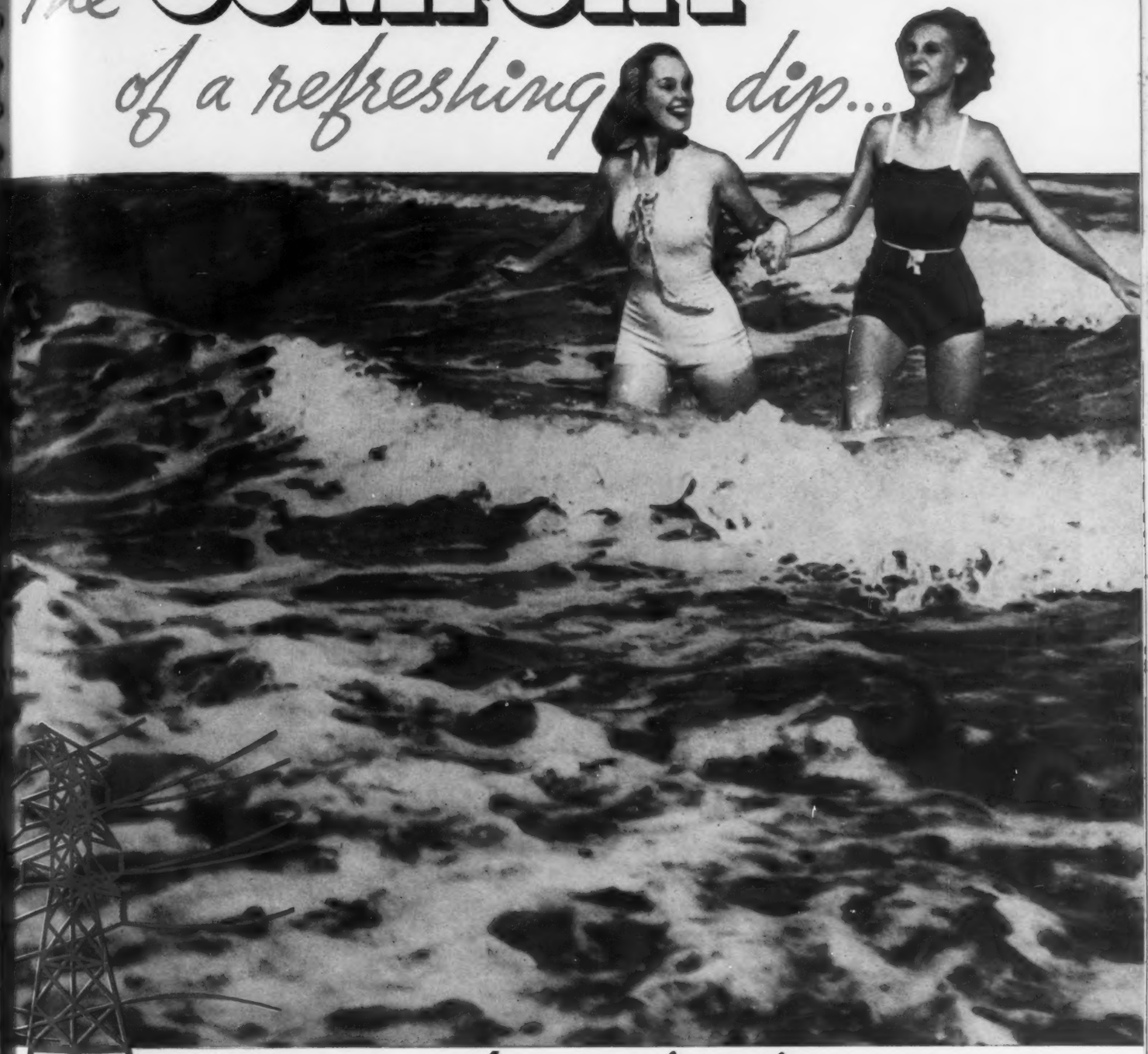
100 Years of Manufacturing Experience is back of every Colt Built Product

COLT-NOARK

SWITCHES INDUSTRIAL CONTROL EQUIPMENT FUSES

Boston
New York
Chicago
Philadelphia

The COMFORT of a refreshing dip...



...brought by wire

It's not necessary to go to the seashore or northern woods to get relief from sweltering heat these days. Less people are complaining about the weather ... more are doing something about it, by air conditioning homes, offices, stores and restaurants.

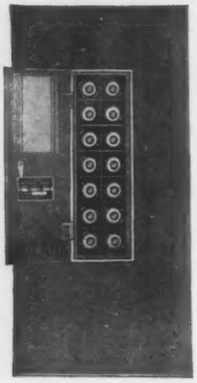
In taking air conditioning from the experimental to the perfected stage Westinghouse, backed by a well trained, experienced dealer organization, has played an important part. Through the development of hermetically sealed condensing units ... through the application of aggressive dealer selling ... and through careful engineering and installation the Westinghouse organization has brought real year-'round comfort to thousands of people.

When the thermometer rises and your load curve keeps pace remember that air conditioning load building is only one of the many programs being carried on to increase your year-round load ... and only one of the activities promoted by your purchases of Westinghouse central station equipment.

J 91283

Westinghouse

EXTRA
NEW KILLARK AGENTS GIVE ELECTRICAL INDUSTRY IN THE WEST IMMEDIATE SOURCE OF SUPPLY . . . . . .
KILLARK QUALITY FITTINGS NOW STOCKED IN LARGE QUANTITIES
. . OUTSTANDING AGENTS HANDLE OUTSTANDING KILLARK LINE
KILLARK ST. LOUIS



SURFACE AND FLUSH TYPE FUSE PANELS

BELL AND SIGNALING TRANSFORMERS

ENTRANCE HEADS AND ELBOWS

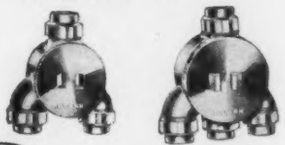
● This announcement makes the front page because it is the biggest electrical fittings news of the day. Killark goes West in a bigger and broader sense. The appointment of four outstanding agents in their respective locations is a logical move. It is one that brings the advantages of the more acceptable Killark fittings to the electrical industry of the West.

Killark Fittings are made of unbreakable, malleable iron and are known for their "flat backs." Approved for their quality—listed as standard by Underwriters' Laboratories—complete factory stocks carried by agents indicated below.

KILLARK ELECTRIC MANUFACTURING CO.

3940 EASTON AVENUE, ST. LOUIS, MO.

CONDUIT BODIES IN EVERY HUB COMBINATION, THREADED AND THREADLESS FOR ½" TO 6" PIPE



A COMPLETE LINE OF EXPLOSION PROOF FITTINGS

FLUSH SWITCH FITTINGS

NORTHWESTERN AGENCIES
3224 WESTERN AVE.
SEATTLE, WASH.

W. J. COTTRELL
733 N. W. EVERETT ST.
PORTLAND, OREGON

NOAD AND NICHOLAS
1063 HOWARD STREET
SAN FRANCISCO, CALIF.

HENGER-SELTZER COMPANY
130 S. HEWITT ST.
LOS ANGELES, CALIF.

CURTIS LIGHTING *boosts* SALES

☆ DIRECT MAIL CAMPAIGNS

Thousands of broadsides and folders—colorful, generously illustrated pieces—are mailed every month to selected lists of potential users of better lighting equipment. A majority of the resultant leads are sales.

☆ PUBLICATION ADVERTISING

In all types of commercial fields, full-page advertisements constantly call attention to the superior qualities of Curtis equipment. Coupon returns indicate reader interest in these messages.

☆ EDITORIAL PRESENTATION

Alert editors recognize Curtis "jobs" as outstanding lighting installations . . . they make "news." Photographs and detailed descriptions of Curtis installations appear regularly in leading business magazines.

☆ SALES HELPS

Imprinted point-of-sales literature and display material issued by Curtis builds business . . . reminds consumer of his lighting needs and where he can get quality equipment.

☆ ENGINEERING DATA

Technical data sheets which give detailed information on Curtis products are distributed for specifications, design ideas, etc. Architects and Engineers find this type of data invaluable in the recommendation of suitable equipment.

for **Central Stations ★ Wholesalers ★ Contractors**

. . . with a constant flow of printed messages reaching every class of prospective buyer.

New sales literature is now ready for fall lighting activities in cooperation with lighting sales departments.

Let us send you samples of direct mail campaign pieces and other sales helps.

Just check off the classes you are interested in and pin the coupon to your letterhead.

Mail this Coupon NOW

CURTIS LIGHTING, INC
1123 W. JACKSON BOULEVARD
CHICAGO, ILLINOIS

Send samples of new sales literature for Fall lighting activity on:

- ☐ Show Window Lighting
- ☐ Store Lighting
- ☐ Office Lighting
- ☐ Industrial Lighting

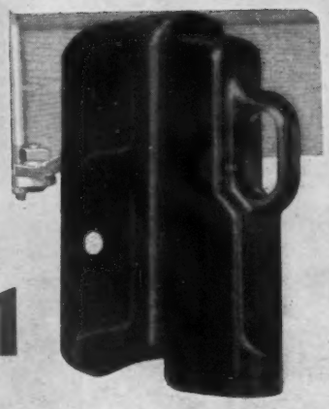
Company _____

Individual _____

Address _____

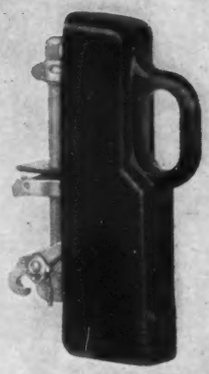
LOOK!

YOUR "BIGGEST BUY" IN CUTOUTS



1

A New G-E Reclosing Fuse Cutout



2

A Door for Converting G-E 2-in-1 Cutouts to Reclosers

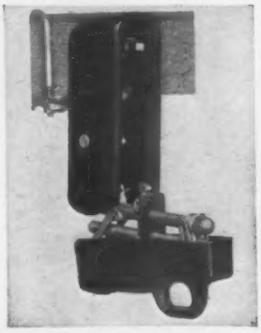
LOW PRICE—Here is a cutout that restores service one second after a temporary fault, and is so low in first cost that it can pay for itself the first time it recloses a circuit.

BEST NEWS OF ALL—Operating companies can obtain this reclosing feature for any of their G-E 50-ampere enclosed indicating and drop-out fuse cutouts now in service or in their warehouse—simply by removing the present door and putting on the new reclosing door.

HOW IT OPERATES

The new cutout restores service after a temporary fault, by means of a second fuse link which is automatically connected in the circuit after the first fuse link blows. The interruption is so brief that motors and other devices will continue in service.

When the first fuse link blows, the door is pushed outward at the bottom, indicating that the fuse link has blown, that the fault has been cleared, and that service has been restored.



In case of a permanent fault, both fuse links blow, with a one-second time delay between, and the door drops open.

HOW YOU SAVE

Because you save one special trip by the service truck and becaus you gain the revenue that would otherwise be lost during the servic outage, the new reclosing cutout can pay for itself the first time i restores service after a temporary fault. Why not investigate th possibilities for service improvement and economy offered by th new reclosing cutout. Available in 50-amp ratings at 5000 volt and 7500/12,500 gr-Y volts. General Electric, Schenectady, N. Y

THE DOOR DOES IT

From a G-E 50-amp indicating and dropout cutout, remove the door....

Put on the new reclosing door....

And you have a reclosing cutout

GENERAL ELECTRIC

340-31

ARVIN *Fan-Forced* ELECTRIC HEATERS

Here's the EFFICIENT FAST-SELLING HEATERS SO MANY PEOPLE BUY

• *For homes, offices, stores, ticket booths, camps, cottages, trailers, etc.*

SELL THEM AND PROFIT

Go after extra profits with these fast sellers. Arvin circulating heat is needed in so many places that there's a big fall and winter demand. These heaters plug into any standard 110 AC wall outlet. Order today from your ARVIN Jobber—and ask him for the beautiful sales building display stand FREE with your order for two or more Arvin heaters.

BUILT TO LAST

Fan motor is induction type. No radio interference. No attention needed, except few drops of oil two or three times a year. Fan draws air in through rear louvres, past nichrome helical type heating coil, out through front grille. Operates on 110-125 volt AC, 50 to 60 cycles. Heavy gauge steel cabinet finished in green enamel.

NOBLITT-SPARKS INDUSTRIES, Inc., Columbus, Ind.

Approved by Good Housekeeping Institute and Underwriters' Laboratories.

Good Housekeeping Institute

No. 200 DeLuxe — **Shown Above** — **$9.95 LIST**

The "tops" in portable heating comfort. Beautifully rounded lines, green enamel finish, chromium-plated grille. Equipped with handy snap switch. Fully enclosed heating unit and fan.

No. 100 Standard — **Shown at Left** — **$7.95 LIST**

Economical portable heater. Compactly built of durable steel. Beautiful green enamel finish. Handle on top. Perfectly safe, with heating unit and fan fully enclosed.

YOU CAN SELL ARVIN CIRCULATING HEATERS FOR THESE AND MANY OTHER PRACTICAL USES

THE NEW matched line..
OF WESTINGHOUSE
WESTINGHOUSE
FRONT
NEW! AND 6 MONTHS AHEAD!
THE GREAT MATCHED LINE—in gleaming white—with eye-appeal — feature appeal — and name appeal. Here is the beauty to demand attention and interest —the product features to whet desire — the name to inspire confidence.
Completeness of line and price range means more sales to a broader market — strength against all kinds of competition with full profit on every sale.
Here is the line that has out-paced the industry, with new selling power and speed. Get the facts from your Westinghouse representative. Or, write direct to Westinghouse Elec. & Mfg. Co., Dept. 7164, Mansfield, Ohio.
W
WESTINGHOUSE ELECTRIC
Westinghouse Laundry Equipment

SHERS AND IRONERS!

1938

Backed by a complete, hard-hitting promotional program—powerful prospect-getting plan — five-point selling strategy — to build *volume with profit* for laundry equipment retailers. Be the first in your market to cash in on this fully organized sales program.

THE KEY

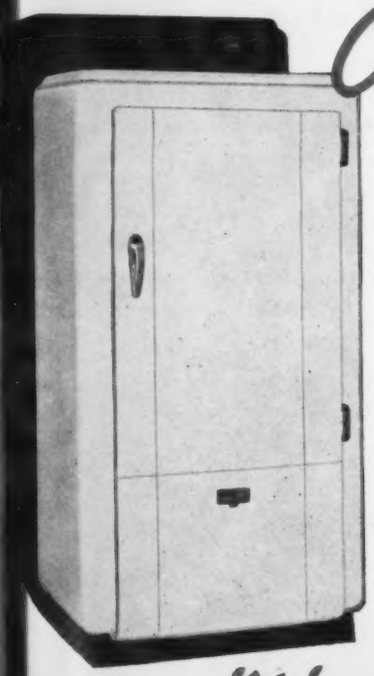
. . . to Westinghouse User Satisfaction

COROX ECONOMIZER UNIT . . . saves from 18% to 46% in electrical cooking costs; exclusively Westinghouse.

FAST HEAT-FLOW OVEN . . . gives far better oven results; exclusive Westinghouse Heat Evener.

Westinghouse *Kitchen-proved* RANGES

SELL UP TO *porcelain!*



Westinghouse makes it easy and profitable

Alert Westinghouse Refrigerator dealers are aggressively "pushing" the new Patrician (all-porcelain) models. For bigger individual sales! For longer profits . . . and better satisfied customers!

And what a sales story these dealers are telling — of lifetime beauty, easier cleaning, freedom from stains, scratches and other blemishes — for as little as *two cents a day additional* during the life of the sales contract.

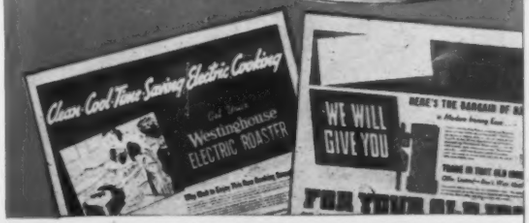
No ordinary porcelain is this which is used in the Westinghouse all-porcelain refrigerators. Applied all at one time to the one-piece cabinet at 1700 degrees F., Patrician porcelain has a more flexible thickness throughout, actually strengthening the cabinet and eliminating most of the causes of chipping.

There's real *quality* here . . . and years of lasting satisfaction for the buyer. You're losing a lot of potential *profits* if you aren't pushing the Westinghouse all-porcelain . . .

Kitchen-proved REFRIGERATORS

SUMMER—PLUS BUSINESS ON 2 HOT ITEMS

Localized follow through on Westinghouse Streamline Iron and Adjust-o-matic Roasters — cashing in on full color pages in American Weekly and This Week. This "buy-now" flyer will make extra sales for you. Ask your Westinghouse representative.



Every house needs **Westinghouse** The line of Least Resistance

SALES OF *Hotpoint* *Soar*

The MASTER

This is Hotpoint's popular round-style water heater for homes which prefer this type of design. Hotpoint Master models are offered in a wide variety of capacities to provide dependable hot water service for all needs.

Follow the leader to new profits from modern electric water heating. Let the sturdy construction and smart modern styling of Hotpoint's complete line of automatic electric water heaters blaze a trail to fresh load-building revenue. Hotpoint's Vogue and Master models are presented in capacities from 1 to 140 gallons. There's a model for every purse and purpose, ready to provide dependable, care-free hot water service for your customers—extra dollars for you. Plan an aggressive water heating campaign this Fall. Build it around this easy-to-sell line. Take advantage of the sweeping public interest in electric water heating. Discover the opportunities that exist in this new load-building market and—cash in now! Call your Hotpoint Representative.

CALROD HEATING UNIT

Hotpoint's famous Calrod heating unit is immersed directly in the water within the storage tank. All heat generated is delivered directly to the water.

See the "Blue Streak" Campaign and Other Hotpoint Sales Helps

"BLUE STREAK" CAMPAIGN

A complete merchandising program. New advertising, direct mail, window display, outdoor poster and "spot" radio announcements. This program provides a complete pattern for your Fall sales activity.

NEW NEWSPAPER ADVERTISEMENTS

A new series of "Would You Believe It?" advertisements. Interesting facts about hot water from the four corners of the earth. Complete—ready to run in your local newspapers. Imprint space for your name and price of model you feature. They'll pull prospects to your salesroom. Use them. Ask your Hotpoint representative.

THE MAGIC FAUCET

This Hotpoint slide-sound film is a colorful and convincing presentation of the advantages of automatic electric hot water service. Useful for consumers, architects and builders as well as for your sales, employe and organization meetings.

NEW DIRECT MAIL

Four new direct mail pieces tell a complete and interesting story of the superior advantages of electric water heating. Send them to your prospects. Use them for "plus" sales.

ELECTRIC WATER HEATERS

to all time high

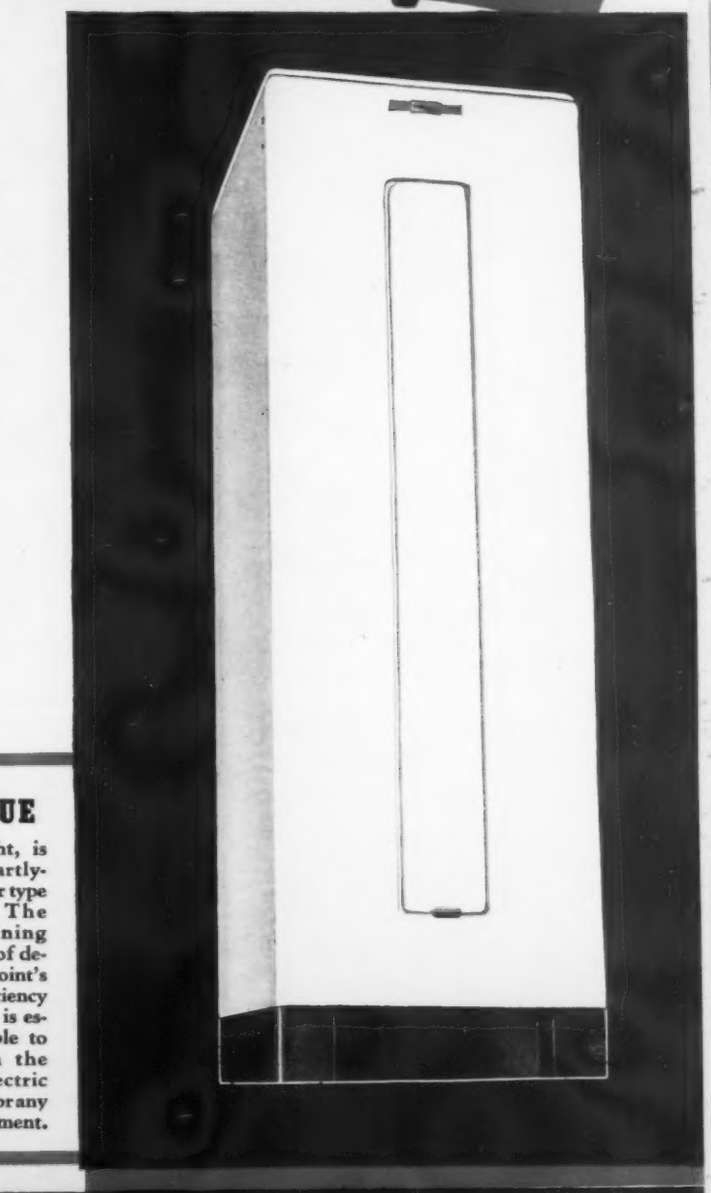
Unprecedented demand for the Hotpoint line of automatic electric water heaters is pushing sales to amazing new records everywhere. The public has accepted the modern, trouble-free advantages of Hotpoint automatic hot water service, and they're *buying* Hotpoint Electric Water Heaters.

Take advantage of this sweeping public interest. Enter this rich market with an exclusive water heater campaign. Discover the opportunities that exist in current interest in new home building, rising national income, increased expenditures for home improvements.

Hotpoint is ready to help with the most complete line of automatic electric water heaters in the industry, and a Fall sales campaign that you can put to instant use. Whether your demands are for off-peak or continuous service, you'll find a Hotpoint model adaptable to your needs. Act now to gain the extra-revenue this most modern appliance affords.

Call your nearest Hotpoint representative or distributor today!

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 W. Taylor Street, Chicago, Illinois

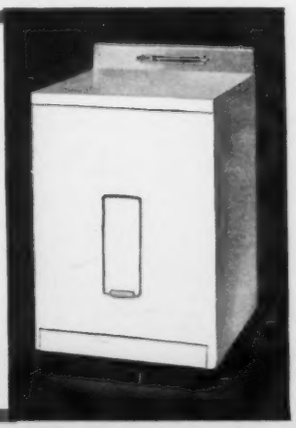


DON'T NEGLECT THIS MARKET

Hotpoint's "Spot" Electric Water Heaters are designed to satisfy the growing demand for quick-heating, small-tank capacity water heaters.

•

Illustrated, right, is the Hotpoint Vogue Cabinette, 30 gallon capacity, designed to fit into the modern all-electric kitchen.

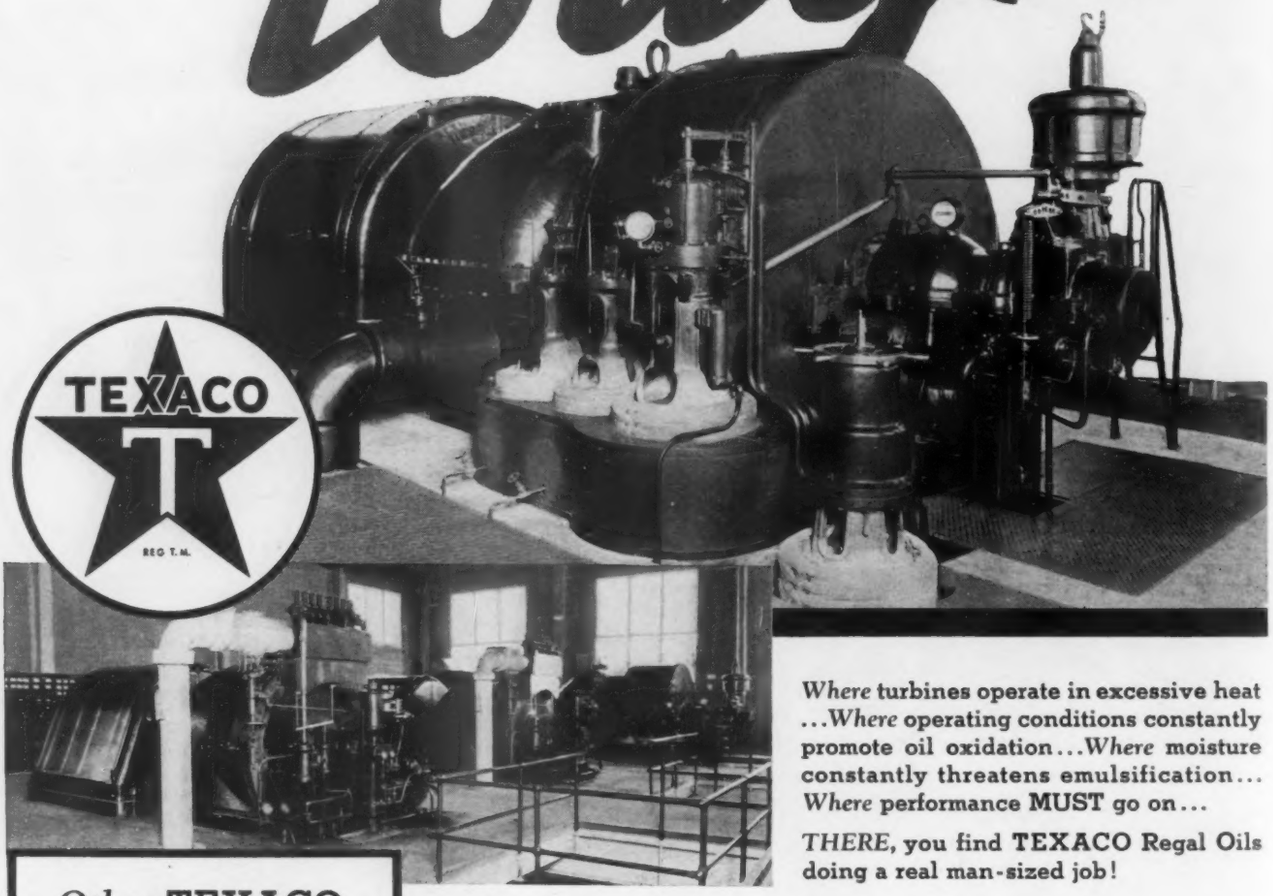


The VOGUE

Illustrated, right, is Hotpoint's smartly-styled rectangular type water heater, The Vogue, combining modern beauty of design with Hotpoint's economy and efficiency of operation. It is especially adaptable to installation in the modern all-electric kitchen, laundry or any part of the basement.

AUTOMATIC ELECTRIC **Hotpoint** WATER HEATERS

WHERE THE GOING'S *tough*



TEXACO

REG. T.M.

Where turbines operate in excessive heat ...*Where* operating conditions constantly promote oil oxidation...*Where* moisture constantly threatens emulsification... *Where* performance **MUST** go on...

THERE, you find **TEXACO Regal Oils doing a real man-sized job!**

Other **TEXACO POWER PLANT LUBRICANTS**

★

TEXACO MARFAK

★

TEXACO URSA OILS

TEXACO Regal Oils are developed by TEXACO Engineers to meet the *tough* conditions found wherever power supply depends on turbine operation. TEXACO Regal Oils, operating under the recommendation of TEXACO experts are whipping oil dilution and oil breakdown problems! Proof? Check Texaco's established record of peak performance in other plants... under operating conditions as TOUGH as yours! *There's* your tip to try TEXACO!

THE TEXAS COMPANY • A CALIFORNIA CORPORATION

TEXACO REGAL OILS

"JUST AN ELECTROMAGNET?"

Sustained accuracy, not initial accuracy alone, is the final measure of the value of any watthour meter. A large factor in assuring the lasting accuracy of the Westinghouse meter are the one-piece laminations that form the sturdy electromagnet core.

The rigidity of riveted one-piece core construction provides constant air-gap spacing and a permanently fixed mechanical alignment of the current and potential coil magnetic circuits. These conditions are essential to sustained accuracy throughout the life of the meter.

IN ADDITION

1. **Both the light load and power factor adjustments are built into the electromagnet making it a complete self-contained assembly. These adjustments, being independent of the other parts of the meter, remain fixed, assuring constant electromagnet calibration.**
2. **The electromagnets are inherently compensated for temperature errors.**
3. **The potential coils are wound by a special method which assures the proper number of turns and also provides extra insulation and mechanical protection for the wires.**
4. **All series coils are hand wound with cable conductors of adequate capacity for heavy overloads.**

Ask our Meter representative about the other features of Westinghouse Watthour Meters. J 40085

Westinghouse METERS INSTRUMENTS RELAYS

PERMAFLECTOR
Built-In Direct Lighting

Modern illumination for modern stores. Efficient direct lighting from concealed sources. Recessed Permaflectors control the light, delivering high intensity of illumination to the merchandise without any glare and with no feeling of excessive brightness.

Standardized equipment. Concentrating type Permaflectors for high ceilings; extensive Permaflectors for low ceilings. Units may be arranged to create patterns on the ceiling and take on the guise of custom-built equipment.

A lighting intensity of 160-foot-candles confined to the display counters is produced in this very modern jewelry store, from an installation of Permaflector Built-In Lighting. Recessed wall display cases are also illuminated from built-in lighting equipment.

A total of 21 direct lighting units of the "GR" type are employed for the lighting of the Garland Sport Shop, at Wenatchee, Wash.

An average intensity of 14 foot-candles is produced in this modern market from an installation of 516 specially built direct lighting units.

Lighting from Concealed Sources

The amazing thing about Permaflector Built-In Direct Lighting is the fact that very high intensities, 30 to 50 foot-candles, can be delivered to the merchandise with nominal wattages. Over limited areas, as in the jewelry store above illustrated, an intensity of 160 foot-candles, at nominal energy consumption, is available.

Diffusing glass plate, or roundel, conceals the reflector and lamp and is used for low mounting. For high mounting, concentric louvers are used. For illumination confined to show case area, louvers are employed.

Write to our nearest representative (listed below) for complete details on this modern built-in direct lighting equipment. He will be glad to work with you on any specific installations.

PITTSBURGH REFLECTOR COMPANY

OLIVER BUILDING, PITTSBURGH, PA.

FRANK E. HASTINGS
810 Transportation Building
LOS ANGELES

HAL A. GARDNER
807 Flatiron Bldg.
544 Market St.
SAN FRANCISCO

Pittsburgh Permaflector

RAYMOND ACKERMAN
318 Dooly Block
SALT LAKE CITY

LYMAN D. MORGAN
239 Securities Bldg.
SEATTLE

VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

Crescent Wires and Cables are

CRESCENT MADE

Every Foot of the Way

A Large Hydraulic Press Extruding Lead Sheath on Power Cable

Here the sole emphasis is placed on the production of wire and cable for electrical use, alone—and every possible operation, from processing raw material to applying the finish, is completed in our plant.

Such specialized manufacturing activity gives full control of quality, impossible to attain by depending upon outside production facilities.

CRESCENT

INSULATED WIRE & CABLE CO. INC

TRENTON, NEW JERSEY

WESTERN REPRESENTATIVES

LOS ANGELES
Henger-Seltzer Co.
130 S. Hewitt St.

SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY, MO.
W. F. Howe & Co.
526 Law Bldg.

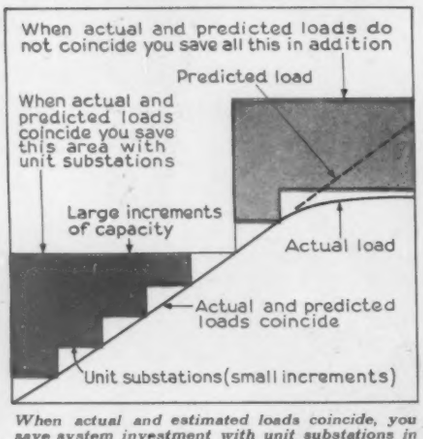
CRESCENT ENDURITE SUPER-AGING INSULATION • WEATHER-PROOF WIRE

Planning for Substation Growth Is

ECONOMICAL AND EASY

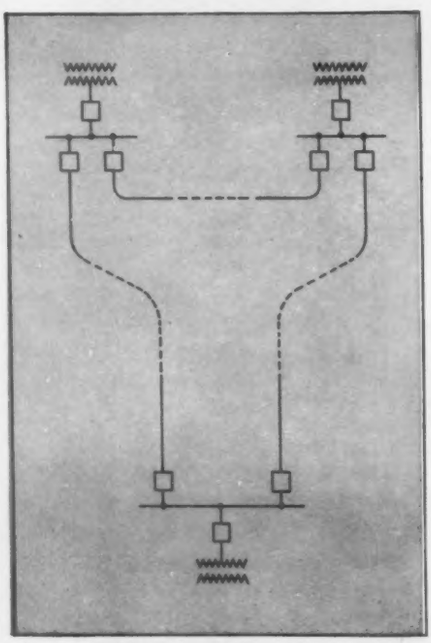
with G-E Factory-assembled Unit Substations

HOW UNIT SUBSTATIONS SAVE SYSTEM INVESTMENT

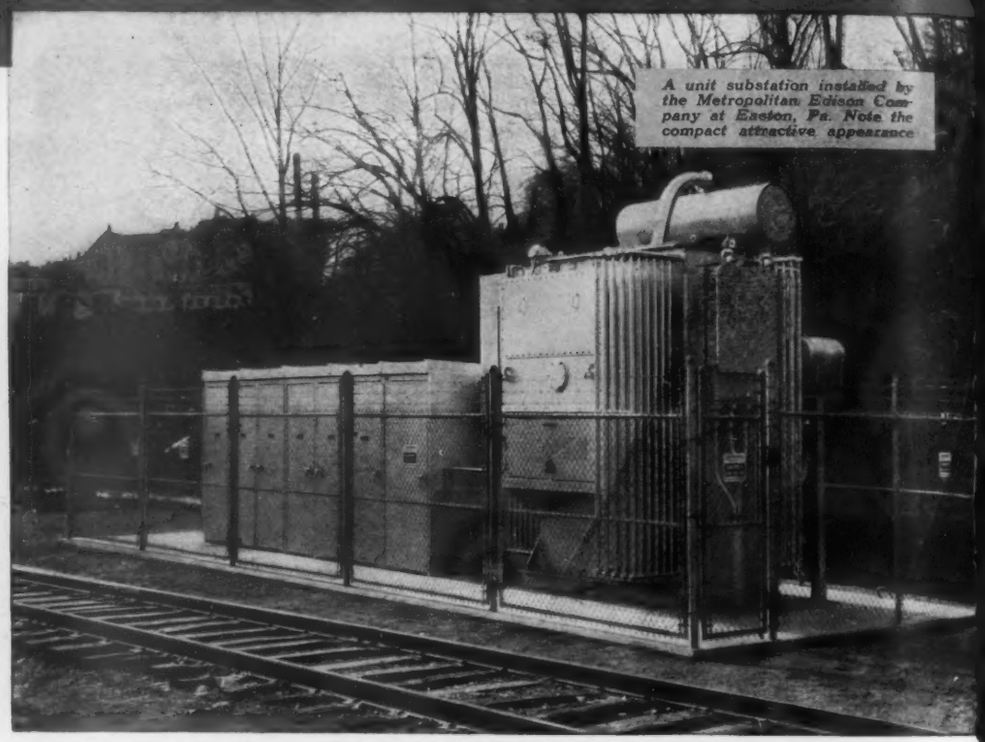

When actual and predicted loads do not coincide you save all this in addition
Predicted load
When actual and predicted loads coincide you save this area with unit substations
Large increments of capacity
Actual load
Actual and predicted loads coincide
Unit substations (small increments)

When actual and estimated loads coincide, you save system investment with unit substations in proportion to the area in dark red. When these loads do NOT coincide you save a greater amount as represented by the areas in both dark AND light red.

HOW UNIT SUBSTATIONS SAVE THE EXPENSE OF IDLE SPARE EQUIPMENT



By slight additions to existing primary lines, unit subs can be tied together and a primary network obtained. You don't need excess spare equipment.



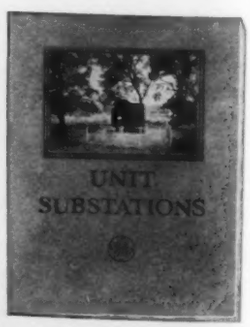
A unit substation installed by the Metropolitan Edison Company at Easton, Pa. Note the compact attractive appearance

Save Real Estate The unit substation is compact and self-contained. It needs little land, and no building. You save real estate and taxes.

Save System Investment You can add capacity in small increments. This saves fixed charges. You also save detail station layout costs because unit substations are shipped assembled and can readily be duplicated.

Save Installation Costs Time required for installation is a matter of hours instead of weeks because you simply set the units in place and connect the cables.

And You Don't Need to Worry About the Character and Location of Future Load The unit substation can be moved quickly and easily to new locations should a shift in the load center demand a change.



This Booklet Tells the Whole Story Ask for a copy of Bulletin GEA-2078. It will give you a complete story on the application of the unit substation. General Electric Company, Schenectady, New York.

310-23

GENERAL ELECTRIC

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND IT APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

August 1937

When Legislation Assures Stability

By ROY M. BUTCHER
Electrical Contractor, San Jose
Chairman, California Contractors' License Board

IF any type of legislation can bring stability, integrity and moral character to an industry, then the California Contractors' License Law has done that for the construction industry. Since the enactment of this law in 1929 there has been a growing feeling among all branches of construction that the general welfare of this great industry has been protected and improved. However, there is still much to be desired, and it is hoped that the recently enacted amendments, together with a strict enforcement of its provisions and a bond of cooperation between the industry and the board, will bring even greater improvement.

It is questionable in my mind as to whether or not the entire construction industry is actually operated at a profit. If there is a gross profit for an industry, it must be small. No actual profit is accruing to an operator if all items of cost have not first been charged, including interest on investments in equipment and property, and all of the other items of overhead which are necessary costs, but which so many contractors fail to deduct from their earnings before claiming that they have made a profit.

It is certain that if every contractor charged the cost of the usual items of overhead, of interest on money invested, of depreciation on stock, tools, equipment and property, and then also charged for his own time at the rate paid his own highest paid employee, he would find that his actual profit was non-existent. Yet he, the contractor, is the man who takes the risk of investing his dollars; it is he who gambles that he will make a profit instead of a loss; who has entered business as an independent operator in the hopes that he will better himself financially beyond the point which he could reach by working for someone else for wages.

If the foregoing statements are correct, then must we not reach the conclusion that the construction industry is being operated in such a manner that it is almost a detriment to the public, rather than an asset? True, it supports hundreds of thousands of persons, and it supplies the building needs of our people; but beyond that it fails, for it is not a profitably operated industry.

The California Contractors' License Board has officially taken notice of this principle and of this condition. Insofar as it may legally do so, its operations will be carried on from the point of view that, as a public administrative body, we will directly and definitely benefit the people of the State of California, if we are able in any way to assist the construction industry to become a profitable industry. The board believes that it will be properly serving the people of the state if it proceeds along the lines of the principle that any man, insofar as he does not injure his competitor, is entitled to the right to make a living. This is one of the fundamentals of the American principle of government.

I believe it advisable for us to consider whether or not the man who operates a competitive business without making a true profit, isn't denying his competitors a right to make a living. If California were isolated from the rest of the world and there were but few electrical contractors in this state, our competitive situation would be no different than it is now with 27,500 men licensed and engaging in this business. If one of these men in one small community consistently takes jobs below cost, his competitors in that community must meet his prices or he will eventually get most of the work. Of course, he will ultimately go into the hands of his creditors, but if another man reopens his shop and continues his policy, the situation will not be remedied. And it does seem as though operators of this type rise as steadily as they fall. If 10 per cent of the contractors of the entire state, spread throughout the territory, consistently take jobs below cost, they will do the same thing to the electrical contractors of the entire state as that single man does in the small community. Therefore, we must agree that the man who operates his business without making a true profit is denying to his competitors their constitutional right to make a living.

Now I know, and realize you know, that the statute has not yet been written and the state body has not yet been set up which can make every man engaging in the construction industry, or even every man engaging in electrical contracting, operate his business at a profit.

The basic provisions of the Contractors' Act are set forth in Section 9. This section provides that upon the filing and the proving of a complaint, a contractor's license may be suspended

or revoked for abandonment of construction project without legal excuse; diversion of funds; wilful and material disregard of plans or specifications; wilful and deliberate disregard of building laws of the state or of any of our cities or counties; wilful or deliberate disregard of the safety or labor laws of the state; aiding or abetting unlicensed persons; misrepresentation in securing a license; or the doing of any other fraudulent acts, or failure on the part of the licensee to complete a construction contract for the stated price, which is, in fact, merely failure to complete his jobs and pay all his bills on all his jobs.

Loss Operation

But there are other grounds for action against a licensee which I wish to discuss—provisions that may apply to our various classes of competitors. One of these is failure to make and keep records showing contracts, documents, receipts and disbursements.

Now I believe that the average contractor who operates his business at a loss is not aware of that fact. That is regrettable, and I make the statement with no pride, for it indicates to me a low intelligence quotient in our business. But if that is the cause of so many of our electrical contractors operating their businesses in a detrimental manner, is there not some hope?

We have in the past year or year and a half had a number of complaints against licensees based upon a subdivision of Section 9 of which I spoke; namely—failure on the part of a licensee to complete his contracts for the price stated. These complaints have usually come to us from owners who have been forced to clear off liens and thus have found themselves obliged to pay sums in addition to the original contract. They have also been filed by general contractors who have been faced with exactly the same situation as the result of operations on the part of their sub-contractors. In most of these cases we have found that the defendant contractor had no adequate set of books and we believe that in most cases the men did not know in what condition they were until a crisis was reached.

The board is watching with interest the progress being made by certain defendants in those cases. Their licenses have been reinstated under terms dictated by our registrar. They have been required to set up a set of records which will actually show them their costs upon each job, including charges for reasonable items of overhead. In some cases they are being required to report to the registrar at the completion of each contract, giving the location of the job, the amount of the contract, the cost of materials, labor, and other items. It is interesting to note that so far in these cases no further troubles have developed, and I believe that each of the men who have been given the chance to rehabilitate themselves are going to prove to be good substantial competitors, and as business men they will be assets to their industry, to their community, and to the state.

At this time it is impossible to state just how far we can go by utilizing the provisions of Section 9 to force contractors to keep the proper set of books. I do not want to give the impression that we will ever find it possible to periodically check every licensee of the state.

But I do believe that any general contractor, or sub-contractor, who is operating his business at a loss, thus endangering the public with whom he deals, should have to submit to this inspection.

Aside from this particular phase of the administration of the law, there has been enacted a set of amendments which become effective August 27, which add teeth to the present punitive provisions of the act and at the same time definitely allow the state license board to prequalify future applicants for licenses within reasonable bounds. Among the most important provisions of these amendments are the following:

Amendments to Law

The $200 exemption clause is reduced to $100 which will bring within the act many contractors and subcontractors, who have hitherto successfully avoided registration by only taking jobs under $200, and refusing work where other construction was also in progress.

The present agricultural clause, exempting licensees from the jurisdiction of the registrar upon the construction of farm houses or upon any other type of work incidental to agriculture or horticulture is almost eliminated. Farmers may still undertake contracts for each other, but a licensee who undertakes an agricultural job may lose his license for any violation of the license law occurring on that project. An attempt to entirely eliminate the agricultural exemption resulted in this compromise with agricultural factions who desire the protection of the license law but do not wish to be required to become licensed because of the interchange of work in slack seasons.

Prequalification

Prequalification of new applicants by the board is provided by an amendment which now allows the board to require applicants to have a reasonable amount of experience and a general or basic knowledge of the building, safety, health, and lien laws of the state. In addition, the board will require applicants to show knowledge of the "rudimentary administrative principles" of the contracting business.

Provision is made for the issuance of licenses to persons who are not possessed of experience by allowing them to have their construction work directed by an individual who has qualified as to experience.

All applicants must, as in the past, prove the possession of good character. Lack of good character may be established by proving that the applicant has previously done some act which would have been grounds for suspension or revocation of a license, or that the applicant had done some dishonest, fraudulent or deceitful act causing injury to another, or that the applicant bears a bad reputation for honesty and integrity.

Suspension of License

The grounds for action leading to suspension or revocation of licenses are also extended by the amendments. Heretofore if the registrar found a licensee failing to operate in the "exact" name in which his license was issued, the registrar was forced to declare such contractor a fraudulent operator and to immediately revoke his license. Such acts are now made the basis for a complaint and the registrar has the discretion of either suspending or revoking the contractor's license, and then only after a hearing at which the licensee may appear in his own behalf.

Contractors knowingly entering into contracts with unlicensed operators will henceforth be subject to suspension by the registrar; and the licensee who causes a material injury because of illegal and wilful failure or refusal to prosecute his contracts with reasonable diligence may be made a defendant before the registrar.

Licensees deliberately failing or refusing to pay other contractors, employees or material men for the purpose of forcing a discount may also be brought before the registrar. A charge of this nature must show that the licensee had capacity to pay, and that he knew the obligation was just, but that he nevertheless refused to settle the account.

Electrical contractors specifically and the whole electrical industry in general have benefited from the provisions of this advanced regulatory law and from its enforcement. The benefits have included greater stability of profitable operations, a keener appreciation of good business ethics and a decent set of business standards.

Welding and Repairing Hydraulic Impulse Turbines

Field Experience in the Maintenance of Impulse Turbines Discusses Welding of Fatigue and Shrinkage Cracks, Improving Efficiency By Changing Bucket Contours, Cavitation Repairs, and Service Life of Metals Used in Needle Tips and Nozzles

By G. R. WOODMAN
Station Chief, Big Creek Plants 2-2A, Southern California Edison Co. Ltd.

IMPULSE turbines are readily accessible for maintenance work and ordinary repairs can be made during short outages. It is customary to plan inspections and ordinary maintenance outages to fall during the valley periods of the system load curve. Such practice makes it possible to maintain the turbine buckets in such condition that progressive conditions such as cavitation and fatigue cracks can be arrested before serious damage is done.

The usual repairs to turbine buckets may be classified under five headings:

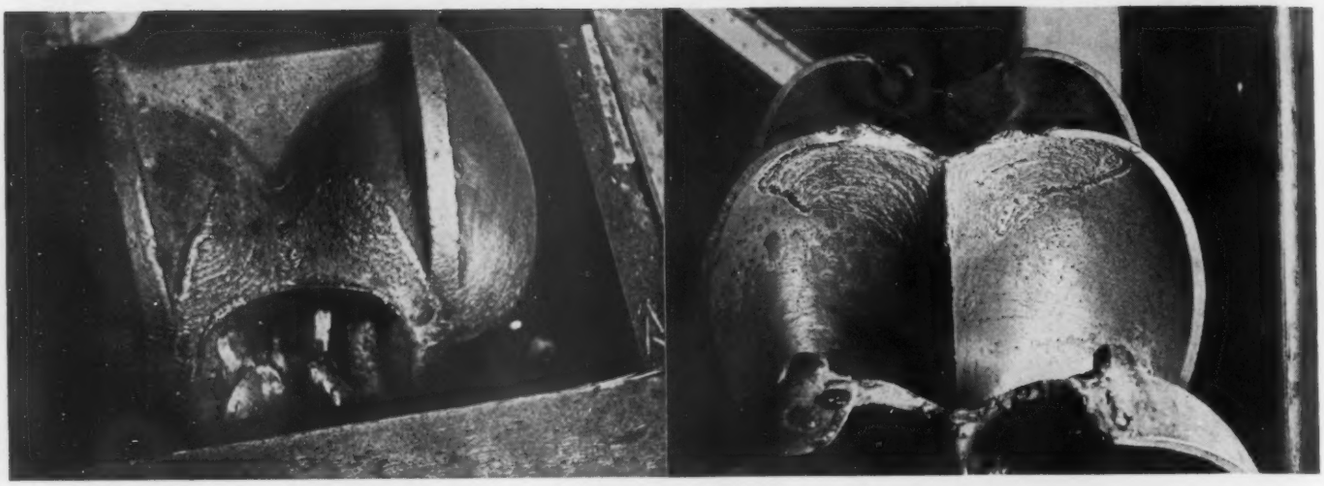
1. The welding of fatigue cracks which usually first appear in the lips of the buckets.
2. The welding of undesirable shrinkage cracks in the castings which may develop into fatigue cracks due to location.
3. The welding to fill areas of cavitation and changing of contours to prevent recurrence.
4. The welding to replace metal scoured from the bucket bowls due to normal wear.
5. The reinforcing of certain sections of fatigued buckets by layers of arc welded metal as a temporary expedient to replacing of the buckets.

Fatigue cracks do not usually appear until the buckets have had several years of service, then suddenly a routine inspection will disclose several buckets with hair cracks in the lips. In making routine inspections for cracks it is a good practice to visualize the probable line of cleavage, which will be the line of greatest stress due to flexure of the bucket bowls when acted on by the jet, and then look carefully at these points for cracks. Attention to the backs of the buckets is important during the inspections as it is there that they can often be seen first; the insides of the bowls seem to have a very thin layer of more ductile metal which hides the crack underneath. It will facilitate detection of cracks if the backs of the buckets have been sand blasted to remove scale. They should not be painted.

Fatigue cracks in the lips are welded as follows: Before any tools are used, the area about the hair crack is warmed by an oxy-acetylene torch which induces strains to open the crack up to its full extent which is often twice as long as first observed. A 3/8-in. hole is then drilled just beyond the visible crack which will tend to stop further cleavage. Metal on each side of the crack is then removed with a pneumatic chisel from both the front and back so that there is a separation of about 3/8-in. The edges are beveled at about a 45-deg. angle. The heavy sections of the bowls are then preheated to about 200 deg. F. with an oxy-acetylene torch. The welding is done with a coated mild steel electrode of usually about 5/32 in. diameter. The first bead on each side is laid parallel to the crack, succeeding beads are put on across the crack. Each bead is peened lightly and wire brushed before application of the next bead. Care is taken to allow time for heat dissipation so that the welded area does not get too hot. Peening relieves stresses.

Deposited metal in a welded fatigue crack is subjected to severe service from the outset as it is in the line of greatest stress and the parent metal had already failed at that point. It is reasonable to expect that the line of cleavage extends much further through the casting than the actual crack so that it is only a question of time until actual separation appears beyond the weld or, as sometimes happens, both through and beyond the weld. Before coated electrodes were used the welds would crack through the center often in only a few weeks time. The coated electrodes give a sounder weld having greater ductility which results in better resistance to fatigue.

Left—Pieces cut from a 10-in. pipe were tack-welded in the notches on either side of the splitter prior to the "building-up" of the bowls by arc welding. Right—Bucket in position for welding backs of the lips, the filler pieces having been tack-welded in place. Note the crack prepared for welding by "V" cut



Left—After welding, the back of the bucket is ready for rough finishing. Right—Front of the bucket ready for rough finishing using high-speed grinders. Final finishing was accomplished by special flexible emery wheels

The wholesale appearance of fatigue cracks is a warning to order replacement buckets. However, due to delays in getting new buckets, or load conditions making long outages undesirable, it may be necessary to keep the buckets in service for another year. In which case reinforcing is resorted to and any shrinkage cracks near the probable line of failure are cut out and welded. Such cracks are those in the fillets at the junction of the lugs and bowls, or inside the bowls near the lug fastenings which may later join with the cracks in the lips and allow half the bucket bowls to break off. Wherever possible the shrinkage cracks are chipped out with special-shaped pneumatic chisels, the edges are beveled, and the welding procedure is similar to cracks in the lips. There are a few difficult places around the lug fastenings or base of the bowls where it is impossible to start a chisel without an unwarranted loss of time. Such cracks are burned out with an oxy-acetylene blow pipe and then the edges are beveled with pneumatic chisels and all burned metal removed before welding is done.

An interesting job was completed recently wherein reinforcing of the bucket bowls resulted in an increase of turbine efficiency. The penstock supplying the unit is in such position at the headworks that it takes a considerable amount of sand from the tunnel, and consequently there has been a great deal of maintenance in past years of the bucket splitters due to abrasive action of the sand. The bowl surfaces gradually become wavy and large areas scoured out. The wear in the bowls reached a stage where it was advisable to weld the most advanced areas of scour during the annual overhauling.

The old design buckets had notches in the lip at each side of the splitter intended to allow the buckets to reach a more advanced position on the wheel before cutting into the jet. Later designs have eliminated the notches and it has been found that "closing-in" of the notches by arc welding has, in some instances, improved the efficiency of existing turbines. It was desired to strengthen the worn buckets against fatigue and breakage.

Curved steel filler pieces were cut from 10-in. pipe with an oxy-acetylene blow pipe and were fitted into the notches as shown in the photographs.

P.C.E.A. Report
Operating-Economics Section

The length of the splitters was increased ¾ in. to take full advantage of the possible bowl area and to secure sufficient thickness of the new metal in the tapered section of the lips to give the desired strength to the bowls.

Paths of the bucket lips relative to the jet were laid out in order to determine the limiting angle for the backs of the lips to prevent interference with the jet, loss of efficiency, and possible cavitation trouble. Templates for this angle were made and used by both the welders and finishers. The reference surface taken was the machined edges of the bowls.

The template for the inside of the bucket lips and extension of the splitters was also used by both the welders and finishers. The machined edges of the bowls were taken for one reference surface and the wheel discs for the other so that the alignment and length of the splitters and shape of the lips were fixed and uniform. The inside of the bowls was carefully built up to the original thickness and finished to maintain a smooth contour to the lips.

Buckets were preheated to about 200 deg. F. with oxy-acetylene torches before welding and care was taken in the arc welding to allow time for heat dissipation. Coated mild steel electrodes, 3/16-in. diameter, were used, and each bead was peened lightly to remove strains before application of the next bead. The welded areas were rough-finished with pneumatic chisels—and then rough-ground with pneumatic high speed grinders using wheels suitable to the speed and mild steel work. The finish grinding was done with wheels made for the high-speed, pneumatic grinders of buffing wheel sections with emery dust glued and baked into the periphery. The resulting flexible wheels had good cutting qualities and had the advantage over solid wheels in producing smooth contour surfaces free from hollows.

An increase in full load efficiency of about 3 per cent was derived from the welding. The cost of the job was about 6 per cent of the cost of rebucketing. It is impossible to predict the remaining service life of the buckets, but no cracks or other defects have appeared during the past seven months of continuous full-load output.

Sometimes it is not realized the tremendous number of impulse vibrations that a waterwheel bucket will receive in a few years of service. Not long ago fatigue cracks appeared in the lips, and later in the bowls, of buckets which otherwise showed little wear. The service life of eight years seemed rather short, so a checkup on loading was made. Excluding motoring and loads under 85 per cent of full capacity, it was found that the unit had made 145,000,000 revolutions at from 85 per cent to full load output. Apparently the designer of the buckets had not allowed for sufficient resistance to fatigue.

A little experimenting has been done with annealing the lip sections of the buckets in place after welding with the

Left—The template used by the welders and finishers for the inside of the bucket lips and extension of splitters to insure uniformity and conformity to most efficient bucket contours. Right—Template used to check limiting angle for the backs of the lips

idea of improving the parent metal as well as relieving any welding strains. A metal shield was placed around the bucket to prevent flames from reaching the wheel disc. Sheet asbestos was used to fill up any cracks between the shield and the bucket. The bucket then was heated by two kerosene torches, the maximum temperature reached was 1,450 deg. F. at the tip of the bucket, maximum for the lugs and bolts was 199 deg. F. The heat was applied for about 15 min. Then the shield was removed and an asbestos lined cooling box was placed over the bucket.

The service records of the treated buckets did not indicate that they were improved but rather that induced strains in the heavier bowl sections produced early cracks at the junction of the bowls and lugs.

A later method of annealing, which seems to have some merit, particularly where extensive welding has been done, is to remove the bucket from the wheel disc and anneal it in an open wood fire. The bucket is placed splitter down on leveled railroad irons and then fired with scrap lumber. A temperature of about 1,250 deg. F. is reached and maintained about an hour for each inch of metal thickness. Then the fire is allowed to die down. It is usually about eight hours before the buckets can be handled. The castings warp very little and when the scale is removed usually go back into position without much trouble. The cost of this kind of job is quite high and can only be justified where an emergency condition exists, such as a shortage of spare buckets or delays in getting replacement buckets.

Another problem of maintenance is cavitation, which will appear wherever the continuity of flow lines of water is broken. The edges of gravel nicks in the splitters and dents in the bowls and lips should be smoothed during the inspections and overhauls otherwise streaks of cavitation will appear beyond them. These streaks will be progressive in action. Care must be taken in the finishing of any welding inside the bowls to see that there are no "humps" left to cause cavitation. Such slight disturbances in contour have caused holes 2 in. diameter and ½ in. deep to appear in the bottoms of the bowls in the short time of two months.

Cavitation in mild form sometimes appears on the sides of the splitters and backs of the lips giving the metal a frosted appearance. Such action often can be arrested by careful dressing with smooth files and emery cloth. Where such treatment fails, welding should be delayed as long as possible on the new buckets so that welding strains may not be present to aggravate any tendency of the bucket metal to fatigue.

Some mention might be made at this time of experience with different metals on needle tips and nozzles. It is the practice of this company to call the removable seat rings of all the nozzles "throat rings," although different manufacturers have different designations.

The original needles and throat rings on the first units were of cast bronze which had a life of 4 to 6 months. The replacement parts were cast locally, the old ones being melted. The short life, however, made them uneconomical when compared with later metals.

Cast steel needles and throat rings cost about the same as the bronze but give 50 per cent longer life. The worn parts can then be built up with arc-welded, stainless steel 18-8 and remachined.

Cast steel with stellite overlay costs about five times the bronze. It is almost impossible to get needles and throat rings without some shrinkage cracks which are difficult to repair. The metal is brittle and will chip at the seat of sharp orifices. It requires regrinding to a new seat about every two years and will last 4 to 6 years. It cannot be successfully repaired in the field on account of the tendency to check unless cooled slowly in a furnace.

Cast nitralloy-treated steel parts cost about twice the bronze. Trouble is experienced in manufacture due to porous metal and its use is not recommended. The service life is about the same as forged nitralloy.

Forged nitralloy treated steel costs about twice the bronze. It requires regrinding after about 18 months service and may be reground once without renitriding. The nitrided parts dent and peen badly by gravel due to the soft interior metal. The dents are followed by progressive cavitation which is very undesirable. There is some disadvantage in not being able to re-nitride in the field. Worn needles and throat rings can be built up with arc-welded stainless steel 18-8 and remachined. The hard surface should be ground off before such repairs are made.

Cast steel with stainless steel 18-8 overlay costs about twice the bronze. It requires remachining to a new seat about every two years. The service life is indefinite as repairs are easily made by arc welding. There is no trouble from shrinkage cracks and the metal can be machined. This is important for field maintenance. Operating experience in this company thus far would indicate that it is the most economical metal to use.

Impulse turbines are not only interesting to maintain but are also interesting to operate. Sometimes a little experimenting with baffles and venting will yield suprising results in increasing turbine efficiency. A report covering a recent experience will be given at a later date.

Modernizing Circuits to Accomodate Growing Loads— A Symposium

Conference Discussion Brings Out Need For Economical Rehabilitation of Older Circuit Interruption Devices and For Better Relaying Methods On Distribution Circuit Phase-to-Ground Faults

BUSINESS recovery has been symbolized by the soaring of electrical energy consumption to new record highs. These conditions impose new requirements of service on the system and have initiated numerous studies, practices and designs to assist the operating company to meet 1937 demands and prepare to serve the increased load of the future.

Load growth has been so great that many substation transformer banks are now too small. The installation of larger banks increases the short circuit duty on switchgear now installed in substations. New equipment, of much larger capacity must be installed in such stations at a considerable increase in cost unless expedients such as hereinafter described are used.

Relay discussion brought forth the main weaknesses of the present type of residual relay. A new type of residual relay should be designed; one operating on a radically different principle is needed to bring the protection against line to ground faults to the same high standard of protection accomplished by current balance relays or pilot wire relays.

Some of our members gave their discussion extemporaneously and others prepared and presented papers, setting forth their ideas. **H. A. Laidlaw,** Pacific Gas and Electric Co., in his paper stated that "the prime object of circuit interrupting equipment is to disconnect a fault as rapidly as possible, not only that a small part of the service involved will be affected, but also that, so far as possible, damage to property and protection to persons near the point of fault will be secured.

In general, in our older types of low voltage breakers installed, there is little that can be done either to speed up their operation or increase their interrupting capacity. The construction and available tank space generally precludes the installation of modern devices for arc suppression such as explosion chambers, oil blast equipment, or de-ion grids and the cost of any revamping of these small breakers does not appear to be justified by the advantage gained.

In such installations as these where breakers prove inadequate to the increasing demand there is little to do but replace them with modern breakers. In one case where the interrupting capacity of feeder breakers was inadequate and a great deal of trouble was experienced with them, the difficulty was solved by installing a total bus reactor shunted by a suitable oil circuit breaker and the relay scheme arranged so that if a feeder fault was within the capacity of the feeder breaker the breaker would open, but should the fault be beyond the capacity of the feeder breaker, the reactor was cut into the circuit to limit the current before the feeder breaker could open.

P.C.E.A. Report

This material is a synopsis of the papers presented at the Fall Conclave of the Pacific Coast Electrical Association on the general subject of Relays and Switchgear. Too voluminous to be included in full, these papers were edited to this abstract, covering the most important details, by F. S. Benson, assistant engineer, Pacific Gas and Electric Co. To him, the thanks of The Editors.

Of the higher voltage breakers, 60 and 100 kv., the Pacific Gas and Electric Co. has a large number with plain break contacts. A good many of these were designed and built in its own shops. However, both those purchased from manufacturers and those built locally can be described as horizontal-break, plain-contact breakers having either 2, 4 or 6 breaks in series. To improve the performance of breakers of this type, they are being equipped with an expulsion type of horizontal contact designed by one of the switch manufacturers which has proved very effective.

There is one relay application which I believe could profitably be considered by this group. That is the application of residual relays arranged for the disconnecting of star-connected, grounded-neutral circuits in the event of a phase-to-ground fault. These residual relays are commonly connected in such a way that they are affected by the normal unbalance of the circuit load. Because of this, relay settings must be high enough so that this unbalance will not cause them to function and interrupt the circuit unnecessarily. Such settings may well be considerably higher than the ground current resulting from a wire lying on comparatively dry ground. Therefore the desired protection from the residual relay (that is, to open the circuit on a very low fault current) is not realized."

H. W. Schmidt, Pacific Gas and Electric Co., remarked: "With the ever increasing expansion of electric facilities in the rural areas, new feeders have been projected for many miles into summer home sub-divisions and along rural roads in agricultural regions. These lines are exposed to the extra hazards of falling tree limbs, which in many cases cause failures to ground. It is standard practice to use induction over-current relays for line-to-line faults, together with a ground relay operated from residual currents in the current transformer neutral wire to clear ground faults.

Since these feeders are star-connected, 4-wire, with a neutral conductor there is almost always some unbalance due to the diversity of single phase loading. In many cases, particularly where there is some urban load on the feeder, the degree of unbalanced current precludes a low current setting of the ground relay.

It has been found from experience that a minimum ground current setting of less than 20 per cent of the minimum overload setting of the line relays is liable to cause interruptions due to normal unbalance load. It is quite evident that the usual relay application for line failures involving ground faults is unreliable on account of the necessary high current settings, and because of the indeterminate nature of the fault itself which may be of relatively high resistance thus limiting the flow of ground current to a value below the relay setting.

It would seem to be possible to get more positive relay action by utilizing

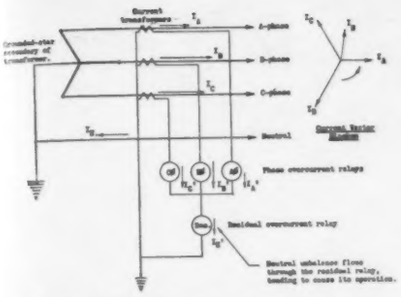


Fig. 1—Conventional residual and phase overcurrent protection. In this scheme, neutral unbalance tends to cause relay operation making a high setting of the residual relay necessary

the actual ground fault current to operate the relay. This could be accomplished through the use of power directional relays with one element connected in the common wire of the circuit relay current transformer with the directional element operated from a low ratio current transformer connected between the station transformer bank ground and the point where the neutral connection is made to the station ground. This, of course, requires that the line neutral be insulated from ground throughout its entire length.

Through the use of low energy ground relays, operated at low current settings with a low ratio ground current transformer, it should be possible to obtain relay functioning at relatively low ground current values. A connection of this kind has certain disadvantages that would limit its application to these stations that have few interconnecting circuits with other sources of supply on account of the necessity of having the neutral wire independent for each circuit source. This would require 4-pole switches at the points of parallel between feeders supplied from different stations."

W. D. Howell, Pacific Gas and Electric Company, gave detailed discussion of ground fault protection for distribution circuit. He said: "Sufficient fault current can usually be developed to operate protective devices in cases of phase-to-phase short circuits. However, when a phase becomes faulted to ground, it is often difficult to produce enough current to operate less sensitive protective devices than are commonly used for phase protection. There are several reasons for this condition.

In the first place, only the voltage between a phase and neutral is available to produce current flow in case of the ground fault. This is but slightly more than one-half that available in the case of a fault between phases.

Secondly, the impedance of the circuit involved in a ground fault is much higher than that of a phase short circuit. Two factors contribute to the high circuit impedance of a phase-to-ground fault. One is the high resistance of the earth return path. The other is the wide separation between the phase and this earth return path.

In considering possible modifications which might be applied to circuits for the purpose of clearing ground faults, the use of bare wire immediately presents itself. This would insure a more complete contact of the conductor with the ground when it falls, thus increasing the current flow and improving the probability of correct clearing action by the protective devices. In addition, a bare, energized wire lying on the ground is certain to cause some arcing and will warn persons away. It would help overcome a public belief that a fallen wire can be safely handled if it has a covering.

A method of reducing the ground return impedance on circuits equipped with a neutral wire would be to ground

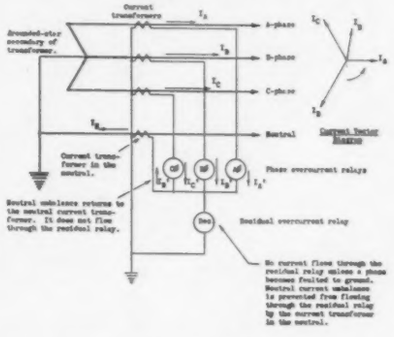


Fig. 2—Improved relay connection with current transformers in the neutral which is connected so that only fault current flows in residual relay. Applicable on 3-phase 4-wire circuits where neutral is carried along the line

such neutrals at reasonable intervals throughout their length. Advantage could be taken of existing grounds at air switches, transformer vaults, and similar locations. The current from a ground fault on such a circuit would return, for the most part, through the neutral to the source of supply, instead of by an earth return as formerly. This lowering of the impedence in the fault circuit would increase the fault current, assisting in the operation of the protective devices.

The residual relay is the most effective form of protection available to clear 3-phase distribution circuits upon which ground faults have developed. As the name implies, this relay is connected to operate on the residual unbalance current between the phases of a circuit. Its use makes possible protection at much lower current values for ground faults than for phase-to-phase faults. This is a very desirable feature for it is often necessary to maintain the operating values of relays on the phases at relatively high values to carry the normal load, with adequate allowance for fluctuations.

Use of residual relays on 3-phase circuits which carry a neutral sometimes leads to trouble in the form of the normal load unbalances returning on the neutral wire, causing incorrect operation of the residual relay and unnecessary interruption of the circuit. This type of incorrect relay operation can be avoided by providing a current transformer on the circuit neutral in addition to those on the three phases. The secondaries of the four current transformers should be so arranged that the unbalance from the phase current transformers returns to the neutral current transformer, and is prevented from passing through the residual relay. In making such an installation, care should be exercised to prevent stray neutral current returning from other circuits and causing incorrect operation of the residual relay."

F. S. Benson of the Pacific Gas and Electric Co. described the methods used to extinguish the arc in different makes of oil circuit breaker equipment. The use of reactors to limit the short circuit duty on circuit breakers has an effect, during disturbances, to increase the transient stability limit of a system. His paper also pointed out that reactors increase the reactive power required and thus necessitate the installation of corrective apparatus. The increased use of current limiting reactors also adversely affects the interrupting ability of switchgear due to the increase of the rate of recovery voltage rise after a fault is cleared.

Voltage regulators were credited with providing better voltage conditions after a fault is cleared and also aiding certain types of relays to function properly during prolonged disturbances. Relay types were described calling attention to necessity for a better residual relay.

The attentiveness with which the members attending the conclave listened to the various papers presented demonstrated the current interest taken in switchgear and relay improvements and design.

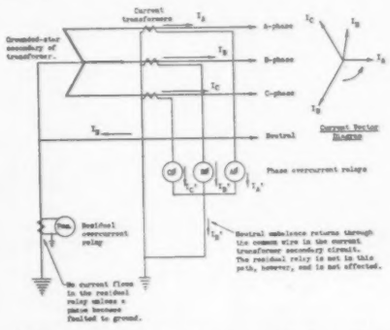


Fig. 3—Residual relay connected in the transformer neutral instead of with the overcurrent relays accomplishes the same result as shown in Fig. 2

Office Building Modernization

Provides High Load Density, Flexible Sub-Metering

Seven-story Jewelers' Building in San Francisco now has capacity of 6 watts per sq. ft. for lighting and convenience outlets. Stairwell area used for vertical bus riser. New system provides for sub-metering each tenant's quarters.

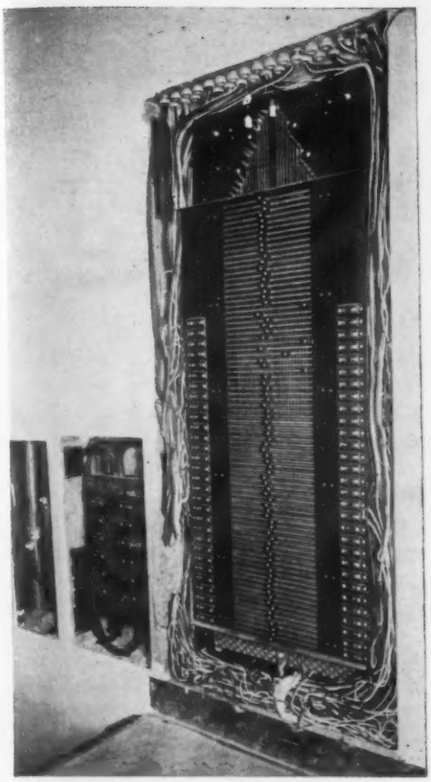
IN MODERNIZING the lighting distribution system of the Jewelers' Building, San Francisco, Hunter & Hudson, consulting engineers of that city, have designed an installation which incorporates so many innovations that it sets a new standard for electrical modernization of buildings. Among the many factors which had to be considered in the planning, was provision for accommodating the higher capacity required by improved business conditions. This seven-story structure is devoted to tenants requiring fairly large space for offices and requiring the high illuminations necessary to jewelry manufacture. As delicate work was involved, the lighting installation had to be of the highest standard. And complete flexibility was essential in order to accommodate changes in occupancy or process. Furthermore, numerous socket devices employed in the manufacturing required that considerable power be available through convenience outlets. It was decided that to insure both adequate lighting and power requirements circuit capacity to give 6 watts per sq. ft. was essential over the entire rentable portion of the building. Second consideration was the desirability of sub-metering the energy used by each tenant, this being complicated by widely varying space occupancy and by the frequent changes or enlargements of rented space by any particular tenant. The third requirement, and probably the most difficult from a practical standpoint, was to plan and execute installation with minimum inconvenience to tenants. All these requirements were successfully met by careful design and the use of modern equipment.

Although not theoretically the most desirable place for the center of distribution, the central stairwell in the building was selected as the most practicable place to install a new bus-riser system. This location had the advantage of providing open space for front and rear accessibility to distribution panels on each floor and could allow work to proceed with practically no inconvenience to building tenants. Furthermore, distribution runs could be made along the corridors of the building and carried overhead into the various offices to serve the ceiling fixtures of one floor and the convenience outlets in the baseboard of the floor above. These are the essentials of the plan adopted.

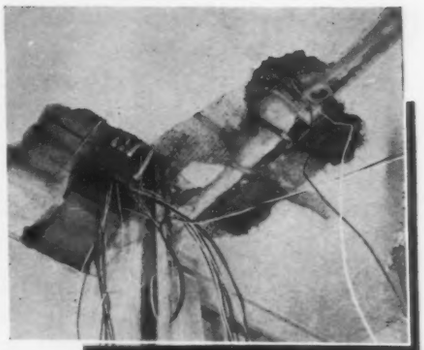
An existing 3-phase power service and a direct current distribution system for watchman's control and other uses was left intact although the main switchboard in the basement of the structure was designed to accommodate these two services in addition to the three-wire, 220-110-volt lighting installation. Service for the latter is taken from the vault in the street through three 2″ O.D. tubular buses in an enclosure running along the ceiling of the basement to a point directly under the stairwell where the vertical bus riser system takes off. A new 2,000-amp., air circuit breaker is installed in this run ahead of the main switchboard, where totalized metering equipment also is located.

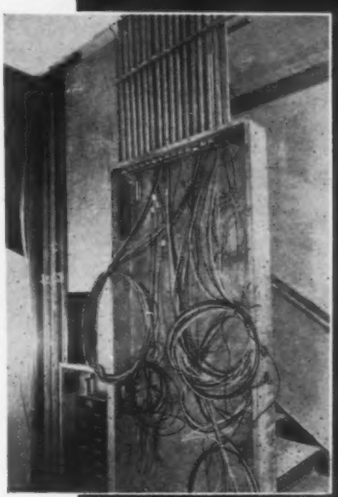
The vertical riser system consists of three 2-in. tubular copper buses extending up the stairwell to the seventh floor. Buses are enclosed in a metal box with insulating guides at intervals. These insulating guides support no weight, the bus being carried on a specially designed footing. The bus itself terminates at ceiling level in the basement, being connected to the service run at that point. Instead of building up a concrete base or anchoring the bus system to the wall at that point, the copper tubes are extended to the lower level, using 2-in. galvanized iron pipe from the ceiling down to take the weight. The iron pipes terminate in bronze shoes which rest in

Below: Typical corridor, showing distribution panel can, conduit runs up into furred ceiling, and along right side, special pull-boxes which permit circuits to loop under ceiling beams into adjacent rooms. Old panel below will be discontinued. Right: Rear of bus and distribution panels showing position of meter panel in respect to stairs. Picture of sockets in place is on top of page 32. Details of pull-box are shown top of page 31



Left: Nearly finished installation—buses at left, disconnecting panel next, and distribution panel with 80 circuits each tapped by a sliding contact and connected to a tenant's meter. Right: Details of pull boxes (top two pictures) which loop under ceiling beams. Base support for each tubular bus (next picture down) is a length of galvanized pipe resting on basement floor in an insulating socket. Front of bus, disconnects, and distribution can before being plastered in as it is shown at the top of the page, left



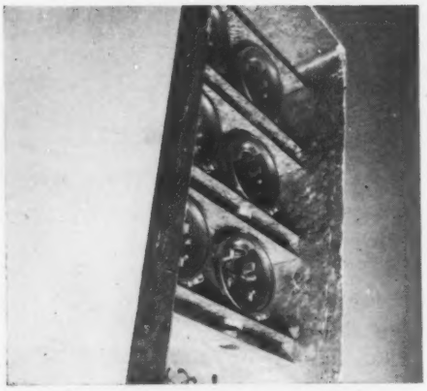


a bakelite insulating socket set in a recessed steel plate. The plate itself is bolted to the concrete floor in the basement, and the entire structure from the ceiling to the floor is enclosed in metal. This design provided support for the structure at minimum cost. As the bus expands, due to temperature changes, it merely slides through the insulating guides along its length.

Electrical distribution from this bus riser system is essentially the same at each floor. The distribution system on each floor is unique in that it combines complete flexibility and high wattage per sq. ft. with susceptibility to the submetering of any particular group of circuits. At each floor level the bus riser is tapped with three 400,000 circ. mil insulated cable which serve a metering distribution panel. The latter is of interest because it provides twelve 2-wire distribution circuits, each protected by de-ion no-fuse breakers, each with its individual watt-hour meter. Disconnecting and overload protection switches are mounted on the front side of the panel. On the rear, the panel is built up in six channels mounting twelve socket-type bases for the bayonet-type contact watt-hour meters. These twelve protected and metered 2-wire distribution circuits are then carried over to the main distribution panel which feeds the branch lighting circuits through an ingenious busing arrangement.

The main distribution panel on each floor provides for a maximum of 80 individual 2-wire circuits. Each of these circuits is protected by a 15-amp. de-ion circuit breaker, and each circuit is connected by horizontal bar buses, ¼-in. diam., on the front of the panel. Extending vertically across the panel and behind the branch circuit are 24 similar flat buses, twelve on each side to accommodate each hot leg of the twelve metered distribution circuits which serve the panel. Thus each leg of each main distribution circuit has an individual tubular bus extending across and in rear of the horizontal buses of the branch circuits. By means of sliding contacts with a clamping action, any number of branch circuits can be connected to any one metered distribution circuit. This panel, which is known as the "no-fuse simplicity meter bar panel board," has provision for 24 conduit risers each of which is capable of carrying four 2-wire branch lighting circuits. The conduit risers come out of the top and bottom of the board in a run which extends both ways along the central corridor. This conduit run is concealed from view by a special furring or subceiling which lowers the existing ceiling approximately 15 in.

The runs along the corridor in the ceiling space thus provided were complicated by the fact that concrete incased I-beams, a part of the building frame, extended along the corridor and across certain bays leaving but 4½ in. below the beams to the top of the furring. This made entrance to rooms difficult. This obstacle was turned into an advantage by the use of specially designed distribution boxes built as shown above. These provided a means of getting the circuit around the obstruction and a point for 3-way distribution into nearby offices. Thus the conduit run was terminated in one side of the special distribution box, a portion of the circuit dropped off by carrying them under the beams and out into the ceiling space of the adjacent room and the remainder continued along the corridor on the far side of the beam. On a typical floor there are five of these special distribution boxes in the central corridor, and from one to three in each wing corridor. From each of these boxes, two 1-in. conduits are carried into the central office space of the wing, terminating there in a distribution pull box, from which are fed the ceiling outlets of the same floor and the convenience outlets



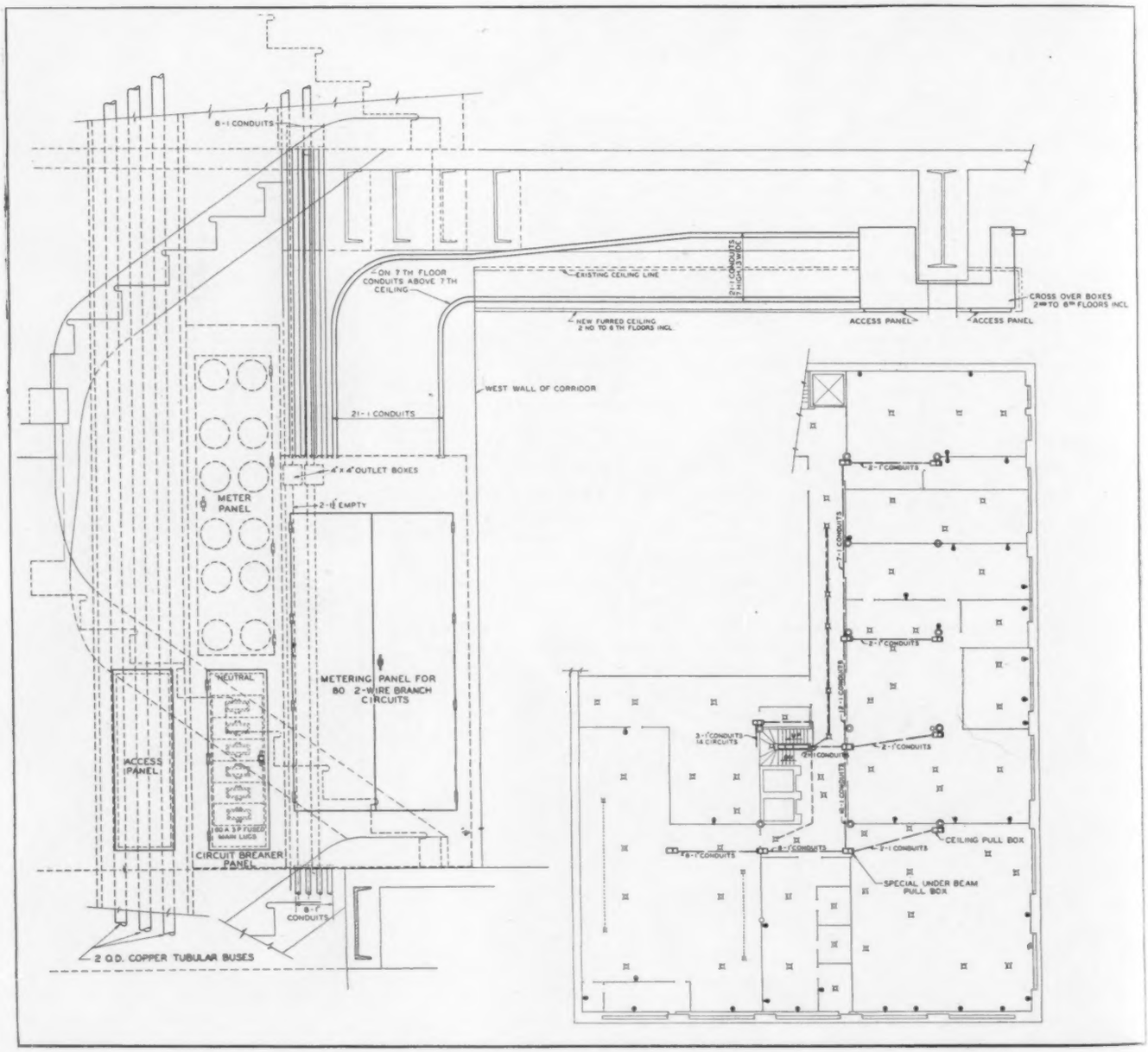
Above: Meter sockets in place, with wall plastered in. Channel for wiring at left. Below: diagram showing relative location of all parts in respect to stairwell. Also, plan of typical floor layout, showing distribution down corridors and to pullboxes in center of bays

of the floor above. This provides eight branch circuits of 15-amp. capacity each for each distribution pull box in the office. As laid out, the capacity of 6 watts per sq.ft. is roughly divided as 4 watts per sq.ft. for lighting and 2 watts per sq.ft. for convenience outlets. The furred ceiling provides a method of reaching both the ceiling of one floor and the baseboard of the floor above.

As each of the branch circuits carried out into the building area proper originate at the meter bar panel, it is evident that by proper connection of the taps at that point, any number of circuits can be placed on one meter. Thus, by rearranging the taps, a tenant can be metered for the power he uses regardless of the area he occupies.

In this way the building owners have assured themselves of continued occupancy. Through approaching the plan with engineering methods, looking beyond the present to the needs of the future, and utilizing the most modern equipment and tools, the installer performed an outstanding job.

From the contractor's standpoint the design is likewise greatly favored by Charles A. Langlais, electrical contractor. Although some difficulties arose, they were chiefly due to the inevitable problem of fitting precise new equipment into an old building which in practice always develops a few dimensional differences between floors that must be adjusted on the new installation. But for a way to bring up the adequacy of an old building economically, this method has more versatility and better accessibility and will prove easy to work with far into the future.



Wiring Forum

WHERE CONTRACTORS, INSPECTORS, CONSULTING ENGINEERS PROBLEMS, METHODS AND IDEAS ARE DISCUSSED AND SOLUTIONS AND SUGGESTIONS EXPRESSED

Take the Problem Out of In-Built Lighting

By ROBERT G. DUMMEL
Holophane Co., Inc., San Francisco

ARTIFICIAL illumination in the past was provided by flame. The fuel holder was suspended or projected from the ceiling or walls so that combustion could take place and the surroundings protected from fire hazards. fumes and smoke. Thus were born lighting fixtures—not from desire but from necessity. With the advent of electricity these factors were no longer present. An electric lamp does not require oxygen for combustion nor ventilation, neither does it produce fumes or smoke. It need not be a fire hazard if properly handled or protected. These features of the incandescent electric lamp have then led quite logically, to what we may call "In-Bilt" lighting where the lighting equipment becomes an integral part of the construction and architecture. This is a natural development since it now permits a room to be lighted from artificial windows in ceiling or walls.

As civilization advances and becomes more complex, new problems arise. This is just as true in lighting as it is in politics. Consequently "In-Bilt" lighting presents new considerations in the manufacture and installation of the equipment producing the illumination. No attempt will be made here to go into the various forms of "In-Bilt" lighting and how they may be constructed. The subject of design of the type of installation or planning of the system should be complete in itself. In this article it is desired to present some suggestions for the benefit of the inspection departments to aid them in assuring safety and protection to the general public.

While engineering experience has been primarily concentrated on the design and application of prismatic "controlenses" and reflectors used in suitable housings, the detailed study required in jobs of such magnitude as the National Broadcasting Company at Radio City and their studios in Hollywood, Denver, Oklahoma City and others; Stanford University Memorial Theatre; Monterey and Alameda County court houses; Ohio State Senate Chamber and hundreds of others of a lesser size has fully acquainted us with the proper, desirable construction of metal housings and enables us to make authoritative statements and recommendations regarding construction and installation of "In-Bilt" equipment.

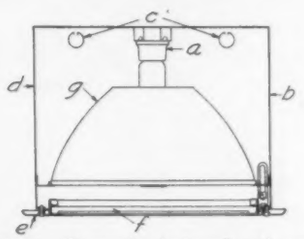


Fig. 1—Correctly designed and constructed "In-Bilt" fixture

a—Porcelain water-proof, high heat cement socket; b—No. 16 gage steel rough box with welded seams; c—Standard knockout for rigid conduit connection; d—Baked enamel finish outside, heat resisting aluminum glyptal lacquer inside; e—No. 16 gage steel trim, nickel plated finish; f—Prismatic "controlens"; g—Prismatic reflector

Close cooperation with electrical inspectors in various municipalities and with the National Board of Fire Underwriters, makes it possible to manufacture these new forms of lighting equipment so that they may be used with absolute safety in any location. Manufacturers and electrical contractors both working with the electrical inspection bureaus should recognize that their existence in this field can only be possible if the product is installed with perfect freedom from any possibility of fire.

One of the most important considerations where a fixture is being recessed is the matter of temperature on the exposed parts of the fixture. The National Board of Fire Underwriters have long recognized the importance of limiting the temperature on the exposed parts of lighting fixtures when they set up the following specifications

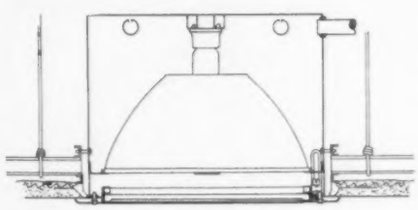


Fig. 2—Detail of correct installation for "In-bilt" fixture

"TEMPERATURES"

"The temperature of exposed parts of fixtures (excluding surface of lamps) shall not exceed 100 deg. C. (212 deg. F.), and the temperature of supporting surfaces and other parts normally in contact with combustible material shall not exceed 90 deg. C. (194 deg. F.) when operated with the largest size lamp or lamps which normally will be used in service."

Now, however, it becomes imperative that further requirements be set up by making more detailed specifications covering manufacture and installation. Broad experience in this field suggests the following detailed specifications for the construction of a mechanically strong and safe unit to be used for recessed mounting:

(A) Maximum temperatures based on an ambient temperature of 24 deg. C. are as follows:

LOCATION	Temp. Deg. C.
(1) Any point on box in which fixture is being tested, including points of support and points in contact with the frame	90
(2) Any point on the fixture enclosure not in contact with the box in which it is being tested	150*
(3) Asbestos covered fixture wire	150
(4) Phenolic composition	150
(5) Lampholder screw shells and center contacts—also all other current carrying parts	200

*Note: This includes glass which in addition shall not crack or break during the test.

(B) Enclosure of sheet steel shall be at least No. 16 U.S.G. (.0625 in minimum) and shall be protected against corrosion by galvanizing, plating, or an equivalent heat resistant coating such as baked enamel. All other material shall be the equivalent in mechanical strength. To make installation and inspection easy it is suggested that the unit be constructed in two parts i. e. roughing box and face plate.

(C) Seams shall be bolted, riveted, spot welded or continuous welded. In either of the first three methods the fastenings shall be not over 3 in. apart and not more than 1½ in. from each end. At least two such fastenings shall be used on each seam. Solder shall not be used for such fastening but may be employed to prevent turning of parts and where no mechanical strength is required.

(D) Knockouts shall be provided for the connection of a recognized wiring system to the fixture enclosure and they shall be so located that the wiring can easily be connected to the socket terminals.

(E) Thermal insulation is not required but when used shall be non-combustible.

(F) Lamp holders and other wiring devices shall be of standard construction and shall be made of porcelain and shall contain a water-proof high heat cement instead of the usual sealing where such material are used.

(G) Wiring the fixtures shall not be required.

Temperature tests shall be conducted in accordance with rules and regulations

as suggested by the Underwriters Laboratories.

A correctly designed and constructed fixture is shown in Fig. 1 with following temperatures observed:

Maximum temperature on box, 63 deg. C.

Maximum temperature on Controlens, 109 deg. C.

Maximum temperature on socket, 102 deg. C.

Conferences with leading inspectors and installing contractors have suggested the following as good practice to insure safe electrical installation:

(a) Flush fixtures shall be installed so that any recessed portion will be at least ½ in. from combustible material. This does not include supports which may be mounted on such combustible material.

(b) Asbestos covered fixture wire of standard construction, and of a size based on the current requirements of the largest lamps which can be installed in the fixture, shall be used from the fixture to a point at least four feet away.

(c) This wire may be brought to a junction or outlet box which is at least four feet from the fixture, or directly to the box containing the switch which controls the fixtures, if this box is at least four feet away. At this distance, rubber-covered supply wires may be attached.

A detailed explanation of the above suggestions or recommendations follows:

Temperatures still remain the most important consideration from the standpoint of safety, i. e. fire prevention. It is absolutely essential that temperature of all parts that may come in contact with combustible material be definitely limited to a point below that which we know will start combustion. It has been known for years that this temperature should not exceed 90 deg. C. hence this figure should be observed. It is only reasonable too to place a maximum on other parts and 150 deg. C. seems to be the limit which will insure good mechanical construction. Tests conducted and observations made indicate that the socket is a vulnerable point. When the temperature is too high, the lamp base comes loose or the socket itself breaks down with the possibility of short circuits extremely likely. The figure set recognizes both possibilities and has been determined after exhaustive tests on all different kinds of sockets and lamp bases. It should in no case be exceeded. There are many obvious ways of controlling the temperature and one which aids the lighting as well as temperature is the use of a correctly designed reflector. Care must be exercised to be sure the heat is not concentrated at some point on the "controlens" or cover glass which will cause uneven heating and set up strains since the benefits of this reflector will be lost entirely in that case. In addition, the housing should always be ample in cubical content or radiating surface to allow acceptable dissipation of heat. A rough rule or check is to allow 2 sq. in. of surface to a box per watt when an effective reflector is used or 3 sq. in. when no reflector is used.

There has been some confusion in the minds of some regarding the use of insulation material on the outside of the housing. Naturally, this will lower the temperature of the parts liable to come close to combustible material but even greater hazards are liable to be introduced. For instance, the socket terminal or lamp base temperature may then exceed the allowable limit and cause failure at any of these points with a great many obvious attending hazards. In any case where the nature of the installation demands insulation as for example broadcasting studios, or certain air conditioned interiors, very careful tests should be made with the insulation in place to be sure the limiting temperatures at other points are not exceeded. In general a fixture designed for certain size lamps must use the next lower size lamp when insulation material is used. Ventilation is often employed to reduce the temperature. This is good if properly carried out but it too must be carefully designed. There should be no possibility of air currents setting up uneven cooling to cause strains nor should the vents be such that dust and dirt will readily accumulate on the inside of the housing. Not only does this dust and dirt cause depreciation of the lighting equipment with consequent reduction in light output but certain kinds of dust in excess are a serious fire or explosive hazard in themselves. Other ways of keeping the temperature down should be employed such as mentioned above and ventilation used only as a last resort.

This subject will be further discussed at the Inspectors' convention by K. W. Keene, of Underwriters Laboratories, Inc.

The next most important consideration is mechanical construction. In the beginning of "In-Bilt" lighting this item was in the hands of the tinsmith. He specified how boxes should be constructed. Engineers soon found however, that a lighting unit had to be more than just a tin box not only in gauge, but also method of construction. Good construction for satisfactory installation demands that the gauge be sufficiently heavy to permit the box to be used as a "roughing in" or work box. It should be heavy enough to permit rigid conduit connection through knockouts at convenient points around the box and allow plaster to come up to it. No. 16 gauge steel seems to be the minimum that should be used on all ordinary sized boxes and heavier gauges are desirable in larger units. Solder, of course, is not mechanically strong and especially so under the temperatures that will be experienced even where these are under the limit set.

The installation of this new form of lighting is not particularly difficult and does not present many new problems. The electrical features are covered in the suggestions given previously and are now well established practice by leading contractors. Mechanically the fixtures should be mounted firmly and rigidly. This in the case of new construction should be done when or before the wire lath is being installed. Hence the need for a strong and sturdy roughing box. Obviously at this time it is not only easier but much cheaper. In old construction the opening in the ceiling should be framed by angle iron or other similar structural element and the rough box fastened to it. This generally requires the use of an outlet box mounted rigidly at some point above the hung ceiling and flexible cable from outlet box to roughing box.

Wiring is of course most important in the installation. The code calls for asbestos covered wire, Type A, or slow-burning wire, Type SB, where the ambient temperature exceeds 120 deg. F. (49 deg. C). This temperature is away below the maximum allowable and since it is practically impossible to keep the temperature of a recessed unit under this figure, there should never be any doubt but that heat resisting wire should be used. Then, too, since the heat will be conducted along the conduit, the asbestos or slow-burning wire should be carried a certain distance away. Tests show that four feet is a reasonable and perfectly safe distance. This is just as true in the use of ordinary suspended fixtures as in "In-Bilt". As a matter of fact the heat resisting wire may be carried all the way back to the panel board with resulting economy of installation.

A suggested method of installation is shown in Fig. 2.

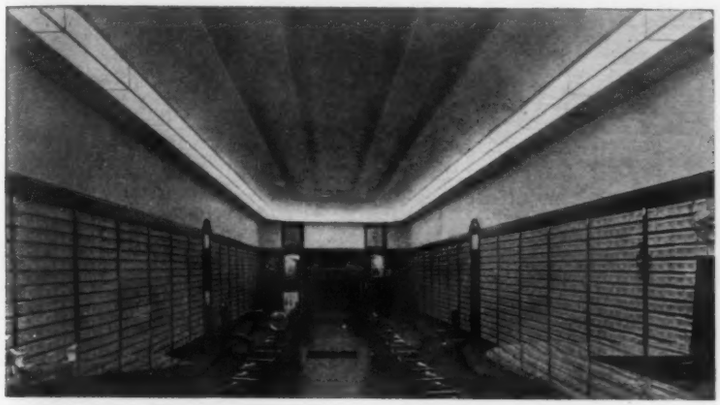
As pointed out above, the problems presented in this new form of lighting are really not new. They have previously all been encountered in various other forms and "In-Bilt" lighting has simply brought them all under one heading. Close cooperation among inspection departments, electrical contractors and manufacturers is required however and it is the hope of the writer that the foregoing will be a step in having adopted a set of standards that will insure the safety and protection of the general public when purchasing this new form of lighting.

Wiring and Installation

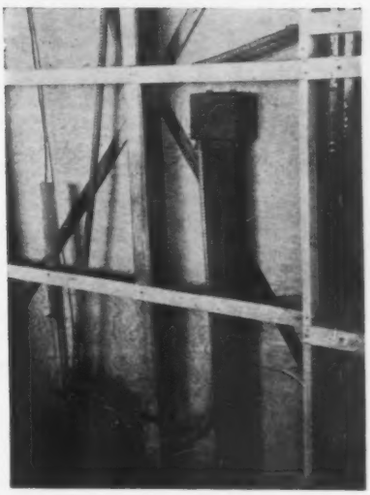
IDEAS — in Brief

New or Recent, Each Contain an Idea that Can be Sold Again

Novel way to use a commercial refrigerator is that shown at right. An Albany, Ore., creamery and restaurant has mounted its display case refrigerator as a window display case. Passerby can see it loaded with dairy products in appetizing array and safely preserved even in hot weather



Thoroughly modern idea in lighting a store is that in this Salt Lake shoestore, where luminous troughs of flashed opal glass eliminate all ceiling fixtures

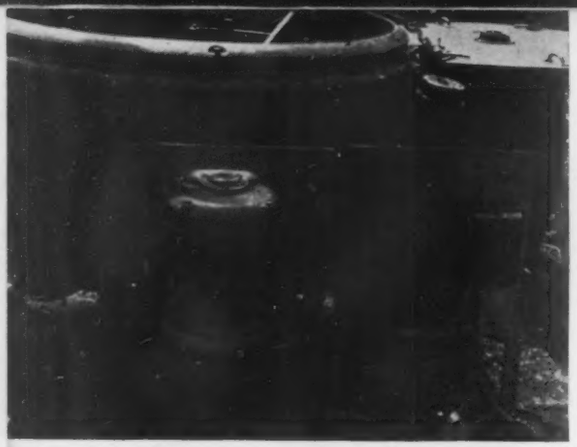


Installation of complete Bosch-cord, a retrievable appliance cord, in kitchen wall of a steel frame house —Sterling Electric Co., San Francisco on Hale house

It took Stone Electric Supply Co. of Los Angeles several years to sell the idea, but when Dun & Bradstreet's office modernized it went all the way, with 63 Smoot-Holman 500-watt units, wired in Wiremold on the ceiling which was then covered with Celotex accoustical ceiling. Employees rejoiced when the inadequate 5 ft. candles was raised to 25 ft. candles. Selling involved negotiations with New York, the local office and building owner. Job required 600,000 circ. mil feeders and several control panels. Efficiency of office force, doing close statistical work, was increased so the 25 kw. increase in load was more than justified

Among the many new homes in the Arcadia district in Southern California electric heat is preferred. Left: Circuits from the distribution panel run in flexible metal conduit make a reasonable job. Next: Kitchen heater mounted at the end of a kitchen cupboard base, near the door. The fan circulates heat throughout the room. Next: Heater with vertical grille mounted in lower wall near a door of a breakfast room. Again the fan circulates the heat quickly, and the heater uses no valuable wall space. Right: Woodwork trim neatly carried around the wall heater from the baseboard panel

Once proud beauty, the old Packard sedan of H. H. Walker is spending its declining days in rugged work on the desert. When he found that he could get nothing for the old car, Harry Walker converted it into a truck



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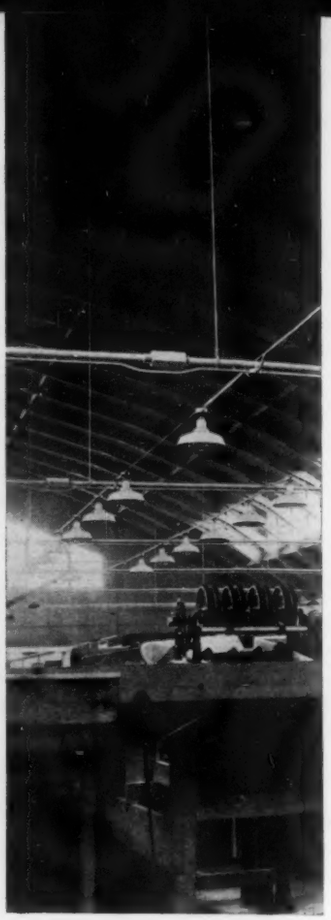
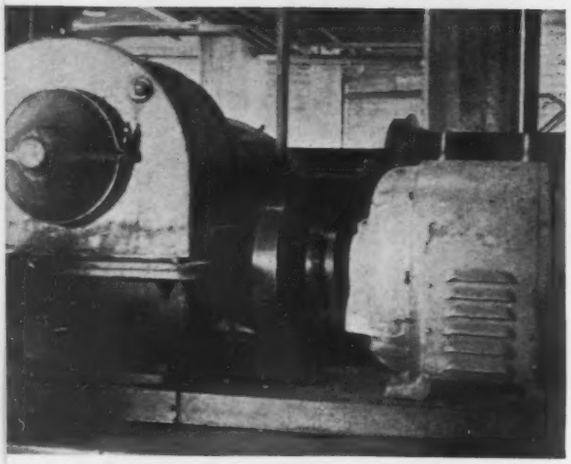
Steel messenger cable running the length of a large high ceilinged packing shed, as in this lemon packing plant at Escondido, Calif., can be used advantageously to support 200-watt RLM. glassteel reflectors and short runs of conduit serving them. Main feeder runs were strapped to the heavy tie-rods running at right angles to the walls and supporting them. Spacing can be anything desired to give maximum light over the work. Units can be individually controlled from levolier switches in the outlet boxes. Installed by Gilbert, Weston & Stearns, of Santa Ana, this plant was a model job in workmanship and equipment. For example, all motor connections were required to have a running splice, cambric, rubber and friction taped joints, and P. & B. paint to finish





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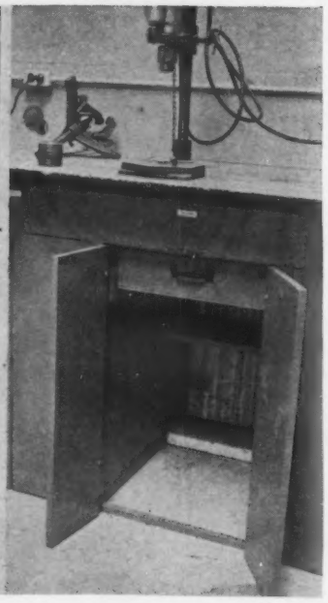
Left: Two applications of Dixon automatic clutch to installations where exceedingly hard starting conditions prevail. Above, a centrifuge to reclaim cutting oil from lathe scrap at the Plumb Tool plant, Los Angeles, with 7-hp., 1800-rpm. motor which a 90-amp. fuse couldn't hold. With the clutch to ease up the starting torque it is now fused at 30 amps. and holds. Clutch is at the bottom of the vertically mounted motor. Below it is a hard starting malt strainer at Acme Brewery, Los Angeles, in which Quality Electric Co., Ltd., saved the reduction gears when a clutch was put between them and the 20 h.p. 8 pole, 900 rpm. motor



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A worthwhile idea in conduit racks is that developed by San Diego Electric Shop (pictured at extreme left). Note the horizontal cross bars at several heights to support short pieces between the narrow bins of the rack. Makes it handier for the workman to take some short lengths than to get the full length pipe for small jobs. Next is a picture of a work bench for the men, with individual cupboards below for each man to store his own tools and keep them out of the way. He may lock it if he wants to. His name is on a label over the doors. Makes a workman feel he belongs

Below: Photo-electric automatic pilot for fishing boats, as installed in large number by California Electric Works, San Diego. New models have an electric steering wheel no bigger than a plate. Course is set and a light beam across a special binnacle unit turns a reversible motor on and off to operate the steering gear whenever the ship gets off its course in either direction. Control unit is shown at left; binnacle unit with photoelectric cell control, below. Motor drive to steering gear not visible. Amplifier tubes and relays are in a separate cabinet in this model

Another novel idea at San Diego Electric Shop is a strip of Plug-in strip mounted flush in the counter. It offers a convenient way to test appliances or lamps. Note the lamp tester made of a plug and socket short-coupled together. The installation attracts notice, on top of the counter, and offers an opportunity to talk up jobs of installing similar strip for customers. Every feature of the shop is designed to be used as an example of workmanship or a service which can be recommended and sold to the customer —lighting, metering, distribution panels, etc.

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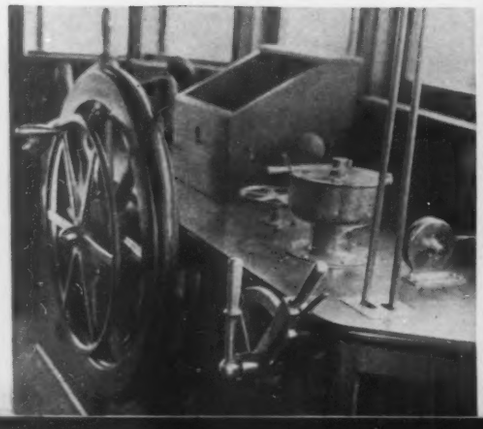

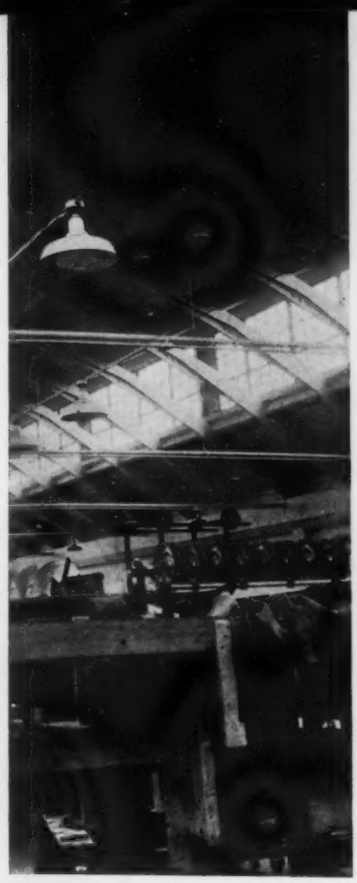

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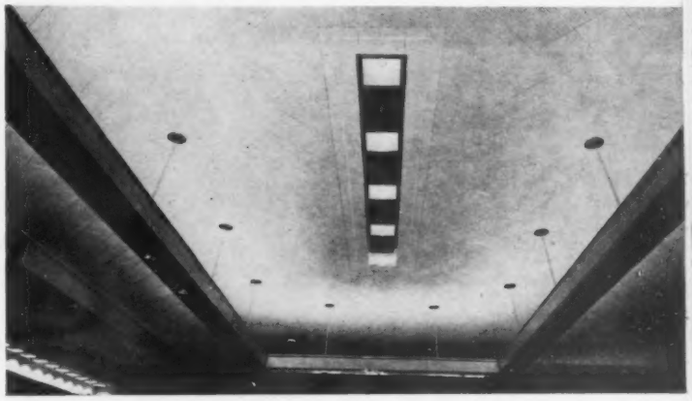
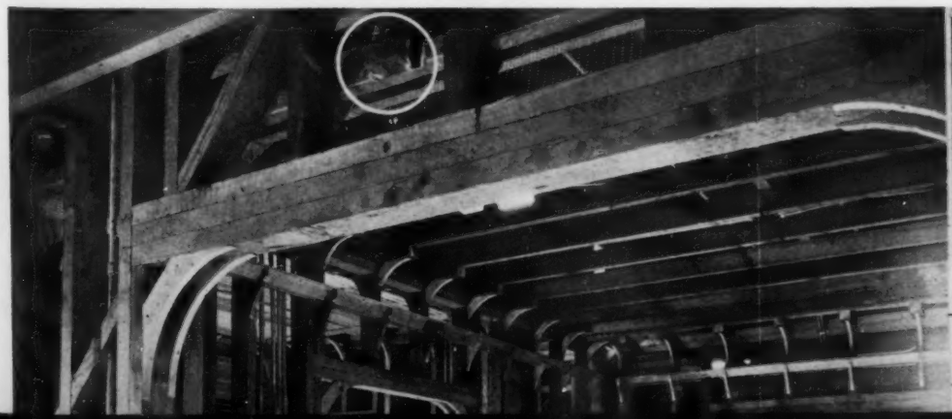
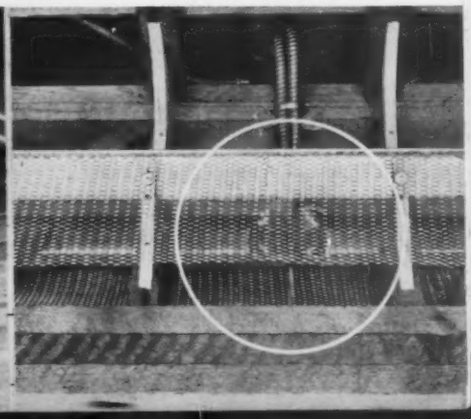
Although it was a fairly modern store front before starting, Tollers of Compton was far ahead of the times when Luminous Structures, Los Angeles, finished making it visually easy to select and buy. Old sign came down and up went a luminous glass panel against which cut-out letters silhouette. Windows were also brightened up, and interior fi tures abandoned for luminous light panels. Modernization has paid better trade

→
An O-shaped trough, 12-in. wide, 80-in. deep, painted white inside, and containing 80 100-watt lamps spread over the 12 by 24 ft. trough, and suspended by 12 slender chrome hangers, was built and installed by Brown-Johnston Electric Co., Spokane, for the Pullman office of Washington Water Power Co. from designs by Ladner Ross, lighting engineer. Additional light from 5 flush ceiling outlets bring a total of 100 ft. candles on displays below



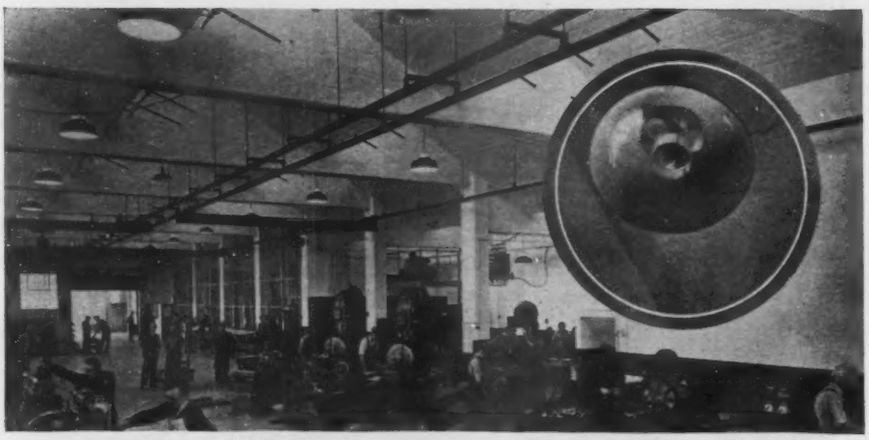
When Joe Lamperdi, of North Bay Electric Works, San Rafael, built a home he tried out many of his numerous electrical ideas in it. Among them were the installation of cove lighting in the living and dining rooms. Pictures below show the cove of metal trough and the bracket supporting it before plastering, as well as the outlet box (circled) which feeds it. Strangely enough the job was planned before the advent of lumiline lamps, which came just in time to provide a smooth and long source of light without spots of extra brightness. Three circuits were provided for use of color if desired for dimming by cutting out part of the lighting. He was planning to make the sockets removable so as to be able to clean the trough with a vacuum cleaner. A Red Seal home, it contains range, water heater, heating circuits; connected load of 18 kw. in lighting and appliances. Voltage drop was calculated, and color coded wire used throughout to facilitate tracing all circuits ↓





Unusual widnow lighting method installed at Mahans Furniture store, Fresno, by Wessel Electric Co., designed by Carl Wolf. A flush mounting type of S & M window reflector was adapted by inserting it into an outer shell in such a way as to allow for adjustment and set in the side of a dropped ceiling as shown. Then in the ceiling itself were used a number of S & M flush ceiling fixtures with convex diffusing glass lenses →

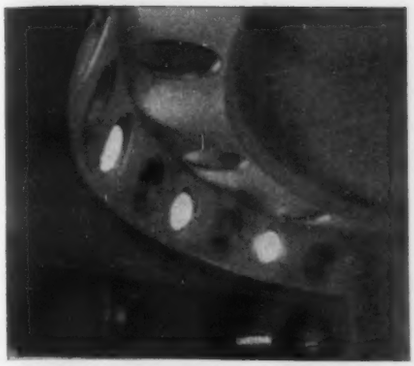
← Santa Ana, California, has a truly modern city hall, electrically heated, well lighted, as this council chamber shows. Gilbert, Weston & Stearns installed 6 5-kw Thermador heaters in it, and temperature is brought up to thermostically controlled maximum in 9 min.. Ventilating system works both ways —either pulls air out at floor level, or reverses and blows fresh air in

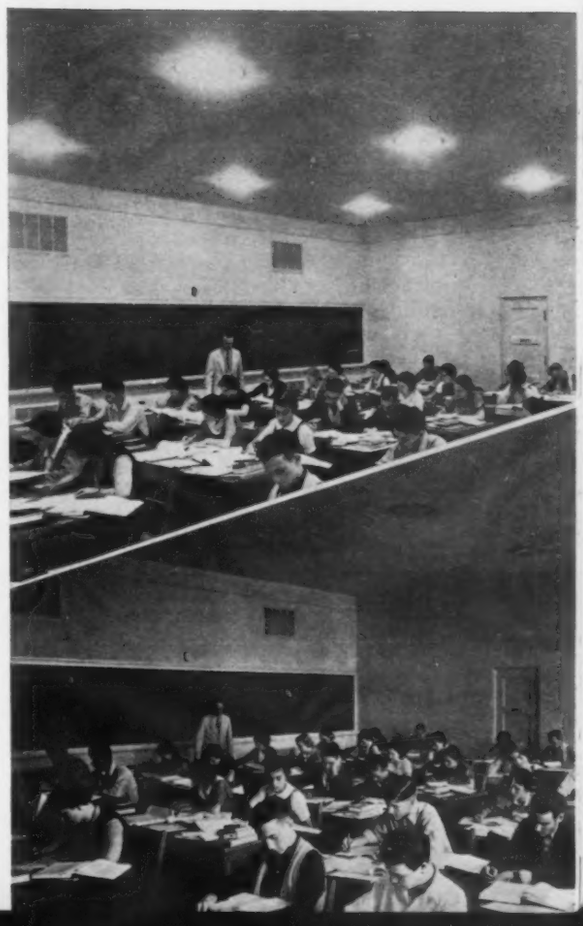


← That light sells merchandise Kress stores know. So, Denver's Kress store is best lighted store in town since Sturgeon Electric Co. rewired and refixtured it to provide 45 ft. candle intensities on merchandise, 240 ft. candles in windows. Special fixtures by Shapiro & Aronson use a 400-watt lamp in a deep bowl X-ray reflector for down light, and 3 100-watt lamps in an indirect type reflector directed on the ceiling for indirect light, 17 ft. above floor level, on 13-ft. centers. Additional local lighting on candy counters and jewelry bring intensities up to 150 ft. candles. When smart merchants like Kress depend on light to do most of the selling for them other stores can do well to use the same technique

← Super in all respects is the special oil well tool plant of Lane Wells Co., Los Angeles, installed by Quality Electric Co., Ltd. Lighting makes use of new combination mercury vapor and Mazda units (shown in inset) with three mazda lamps around the central mercury lamp. Additional local lighting brackets were mounted on many of the machines. Note how machines are placed at an angle to get the benefit from natural light. A lighted tennis and handball court for employees, and high intensity lighting in the offices, make this plant a model industrial installation

← Emphasis by auto manufacturers on reconditioning of used cars and selling them right has created a wonderful opportunity for contractors to sell up to worthwhile jobs like this in Los Angeles—10 1500-watt flood lights on 5 26-ft. steel poles, making it an outdoor showroom.. Jobs like this run up into the $500 to $1500 class instead of a petty $75 job of stringing lamps on weatherproof wire. Sale of cars moved up from 285 to 560 per month on one $1200 job installed by A. D. Norberg, electrical contractor





Windows are no longer necessary to a department store, indeed they represent useless upkeep, now that air conditioning and modern lighting are developed. Eastern Outfitting Co. store at Huntington Park, Calif., is such, installed by George L. Patterson, Los Angeles contractor. Air conditioned, it has no windows except show windows. Because of large beams which would have cut up the ceiling into small bays, hard to light, building superintendent P. J. Messerschmitt decided to use flush lighting in a furred down ceiling. Spaced on 10½ by 11 ft. centers, flush units are equipped with Permaflectors over hinged 12 x 12-in. glass surface lenses. Average intensity is 20 ft. candles with 300-watt inside frost lamps. Ceilings are 10½ ft. high except over the center bay where three indirect units of 1000-watts each are mounted. (In upper picture, notice the light over the street for the traffic officer.)

Two methods of centralizing control of conveyors in fruit packing plants. A gang of flip switches which operate contactors that in turn stop or start all related conveyors and power equipment, in a lemon packing plant at Escondido

Another type of installation at an orange packing plant in Sanger, Calif., where push-button switches were mounted in a desk shaped metal panel. The gang is located at the final sorting platform so that speed of the entire plant can be timed to the grading of fruit

A "Charm Nook" in a drug store in Compton, installed by Luminous Structures, Inc., Los Angeles. Here the customer may go behind the counter in privacy, try out colors of makeup under sunlight and artificial light conditions made possible by lighting behind luminous panels at each side of the mirror. Note, too, how the interior of the store is lighted by long luminous boxes along the side wall which do three things: (1) light the store, (2) concentrate light downward on the shelf stock, and (3) illumine a silhouette sign

Purposely built with few and small windows, Fullerton Junior College, installed by R. R. Jones Electric, Los Angeles, uses 12 S & M flush ceiling fixtures with 300-watt lamps, burning all day long to provide even illumination throughout (as contrasting pictures at right of lights on and off show). Convex shaped diffusing lens spills enough side light to illumine the ceiling, yet protect eyes from glare. Average intensity on desk tops is 32 ft. candles

Sell Better Wiring Jobs With Industry Handbook

By ARTHUR L. ABBOTT
Regulatory Legislation Dept., N. E. M. A.,
Author of Electragists Estimating System,
N. E. Code Handbook, etc.

AS a preliminary to any effective efforts to sell adequate wiring it was necessary that the entire industry first agree upon standards that would fully and completely define adequacy. The need for such standards has been realized for a long time. Red Seal house wiring standards were first drawn up. Adequacy standards for wiring in public, commercial and industrial buildings were compiled and published by the N.E.L.A. The "Certified Wiring Standards" were issued by the California Electrical Bureau in 1929 and it is a matter of interest to note that these standards were officially approved by the Southwestern Section of the I.A.E.I.

These early compilations served a useful purpose but none was sufficiently complete; also there has been a very marked increase in lighting intensities and consequently in wattage requirements during the past few years. It was therefore necessary to produce new standards that would be up-to-date with present-day lighting practice and complete enough to provide a guide for the designer of a wiring installation in all essential details affecting the adequacy of the installation.

The Handbook of Interior Wiring Design fulfills these requisites. It is the product of a representative committee, some of whom, notably Mr. E. A. Brand, who acted as chairman, had been closely in touch with the development of adequacy standards for many years. It has been officially approved by the following national associations: NEMA, N.E.C.A., E.E.I., N.E.W.A., I.A.E.I. and I.E.S. It is apparently meeting with universal acceptance by the industry.

The Handbook is not considered as a completed undertaking. The industry committee has been made permanent and it is the intention to revise the book periodically.

Coming to a more specific discussion of the use of the Handbook, in the first place, it can easily be seen that as a working manual it is invaluable to every person who lays out wiring installations. Its application is by no means limited to large installations—on many jobs amounting to less than $100, good use can be made of the data in the book.

Contractors especially can use the Handbook to advantage in their daily work. The contractor may not feel that it would be good policy to recommend such high standards to his customers in certain cases, but it is always worth while for him to know what wattage per sq. ft., number of circuits and size of feeders and service would be required for an adequate installation, even though the job is not laid out for this capacity. The contractor in many cases should be able to sell a better wiring job by explaining to his customer that standards for adequacy have been drawn up and published in this book, that these standards have been agreed upon by the electrical industry as representing the best practice and that any installation falling below standards will prove to be a poor investment.

Inspectors are of course primarily interested in safety, but a large proportion of the hazardous conditions found on wiring installations are caused by over-loading and the inspectors have very generously taken an active part in the promotion of adequate wiring, because they know that they have no need to worry about overloading where the wiring is adequate. All over the country I find inspectors who are very effective salesmen for the electrical industry. For the inspector who wishes to broaden his field of service to the public, the Handbook provides an authoritative basis for making recommendations for better wiring.

Briefed from the Paper Mr. Abbott will present at the Inspectors convention in Salt Lake City.

Thanks very largely to the production of the Handbook of Interior Wiring Design, the industry has at last become really interested in the promotion of adequate wiring.

Thirty thousand copies of the Handbook have been distributed up to date.

A National Adequate Wiring Bureau, consisting of representatives of five national associations, will soon release the National Adequate Wiring Plan. This plan has been worked out in great detail. It is intended to be suitable for adoption in any locality. Suitable publicity matter of various kinds will be provided.

At the annual convention of the N.E.C.A. to be held in Los Angeles in October, it is announced that the central theme for the program will be "Electrical Adequacy." There are many other projects in all parts of the country for the promotion of adequate wiring that are under way, or in process of development.

While the Handbook can be used to great advantage by every individual who is responsible for wiring layouts, only by organized effort will it be possible to realize its full value in building business. We need local organizations everywhere to promote adequate wiring. Then we need education within the industry (1) to teach everyone in the industry what the Handbook consists of, (2) to convince everyone in the industry that the standards are right, that they call for the least that can be considered adequate wiring, and (3) to bring about, as nearly as possible, universal use of the Handbook within the industry as the only acceptable standard for wiring design. This is all preliminary to the real job of selling adequate wiring to the public.

It cannot be too strongly emphasized that in any local effort to sell adequate wiring, complete cooperation of all groups is essential if the maximum results are to be achieved. All groups will benefit equally and each should therefore do its part; and each group will profit to a far greater extent if all cooperate.

To sum the matter up, we now have practicable and usable standards of adequacy which are meeting with general acceptance throughout the industry as authoritative; we know from experience that with any reasonable amount of selling effort, adequate wiring can be sold; we know that in promoting adequate wiring we are rendering a real and much-needed service to the public; therefore there is every reason why we should all get together and work together for better wiring and more business.

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An adequate wiring committee, to put the National Wiring program into operation in Southern California, was appointed among trustees of the Electrical Development League there. Chairman A. E. Hitchner named Ross Hartley, The Electrical Corp., chairman, and Frank Airey, H. C. Rice, Raymond Holabird, and Herbert Evans, members.

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HOW TO TELL the public what adequate wiring means to the home was the subject of a recent round table conference between home economics editors of national women's magazines and representative men and women of the electrical industry. Delegates were guests of the N.E.M.A.

Inspectors Program at Salt Lake Filled to the Brim

BOTH in pertinent and important discussion on inspection problems and trends, and in recreational opportunities to make the convention trip truly a vacation, the first joint annual meeting of the Northwestern and Southwestern Sections, International Assn. of Electrical Inspectors, at Salt Lake City, Aug. 22 to 26, will be unique. With characteristic devotion to duty the Northwestern Section, for example, plans to begin Sunday night, Aug. 22, with a meeting of its executive committee and smaller code committee meetings. And from then on the program of both instruction and entertainment will be unremitting. Every one who attends will certainly get his full money's worth—both for himself and for his city.

Blaine Grey, chairman of the Utah chapter, will start proceedings on Monday morning, turning over the gavel to E. G. S. Pryor, Northwestern Section president. Even Governor H. H. Blood is scheduled to welcome the convention, and George M. Gadsby, president, Utah Power & Light Co. will likewise welcome the electrical industry. Ralph Wiley, past president of the I.A.E.I., will respond to the welcomes and L. W. Going, new president of I.A.E.I. will give his presidential address. Secretary-treasurers F. D. Weber and H. L. Gerber will give their reports. Even the traveling field laboratory of Underwriters' Laboratories, with R. J. Larrabee in charge, will be on hand.

The business program will include the following talks and addresses:

Monday Afternoon—E. G. S. Pryor Presiding

"Enclosed Type and Recessed Type of Lighting Fixture Installations", by Ken W. Keene, associate electrical engineer, Underwriters Laboratories, Inc.

"Non-Metallic Wiring and Wiring Device Installations", by James S. Mahan, secretary, Standard Electrical Porcelain Manufacturers.

"The Underground Installation of Non-leaded Rubber Covered Conductors", by I. Borda, Okonite Co., San Francisco.

"Motor Installations, Circuit and Overload Protection for Different Types of Motor Installations", by Harold L. Gerber, Department of Electricity, San Francisco.

Tuesday Morning—H. V. Dobson Presiding

"Legislation", by a member of the Uniform Legislation Dept., National Electrical Manufacturers Assn.

"I.A.E.I. Secretary's Report", by Victor H. Tousley.

Discussion of the new arrangement of the 1937 edition, National Electrical Code, by Victor H. Tousley, who is also secretary of the Electrical Committee, N.F.P.A.

"Problems of an Electrical Inspector", by V. R. Volheye, chief electrical inspector, Bureau of Labor, State of Oregon. Followed by open discussion of inspectors problems.

"Electricity in the Copper Mining Industry", by R. J. Corfield, superintendent, Utah Copper Co. (followed by a trip to the famous open cut Utah Copper Co. mines and mills in the afternoon.)

Wednesday Afternoon—L. W. Going Presiding

"Corrosion on Ocean Front Wiring Installations", by H. V. Dobson, president, Southwestern Section, Santa Barbara, and G. E. Price, Orange county, Calif., electrical inspector.

"Electrical Safety", by J. W. Whittington, executive secretary, Flexible Cord and Cord Set Section, N.E.M.A.

"Inspection of Retail Sales of Electrical Materials and Devices", by Ralph Wiley, chief, Dept. of Electricity, San Francisco.

"Report of Joint Clearing House Committee", by E. B. Morrison, chairman Northwestern Section, and B. C. Hill, chairman, Southwestern Section.

"Use of Handbook of Interior Wiring Design", by Arthur L. Abbott, Uniform Legislation Dept., N.E.M.A.

Code discussion breakfasts will be held Tuesday morning (M. P. Hotelling, deputy state electrical inspector, Washington, presiding) and Wednesday morning, (Carl E. Hardy, superintendent, electrical dept., Oakland, presiding.)

To provide an opportunity for each section to conduct its own business, elect officers, hear reports of committees and consider the location of next year's meeting place, Wednesday morning will be given over to separate meetings of the two sections.

Likewise the members of the executive committees and of the code clearing house committees will be busy each noon and every evening, correlating the suggested changes to the code and discussing various phases of interpretation of the rules. But members and guests will have opportunities to visit and to participate in the various entertainment features, which start on Monday noon with an organ concert at the Mormon Tabernacle, and include:

L. W. GOING

President, International Assn. of Electrical Inspectors, Chief Electrical Inspector, Portland, Oregon

Trip to Saltair Resort for bathing in the Great Salt Lake, dinner and entertainment afterward sponsored by Utah Chapter, National Electrical Contractors Assn., on Monday evening.

Trip to Utah Copper Co. mines, Tuesday afternoon.

Annual dinner and dance, in Starlight roof garden, Hotel Utah (informal).

Stag dinner and outing, sponsored by the Electrical League of Utah, Wednesday evening.

Golf tournament, at Forest Dale golf club. Chairman of golf committee, W. L. Winter.

Ladies' entertainment will include a sightseeing tour and tea, Monday afternoon, and a bridge tea and theater party Wednesday afternoon and evening. The annual dinner dance, of course, will be for both ladies and men, as will the trip to the Utah copper mines and trip to Saltair bathing resort, and the organ concert.

An exhibit of manufacturers products will be held on the mezzanine floor, Hotel Utah. John Christensen, of West High School, Salt Lake City, is chairman of the exhibits committee.

Members of the committee making the arrangements for the convention at Salt Lake City were:

General meeting committee, L. B. Johnson; entertainment, W. L. Winter; finance, Blaine Grey; hotel, J. Hyde Stayner; publicity, R. E. Folland; ladies, Mrs. Blaine Grey; programs, A. E. Fleming; reception, L. B. Johnson; trips and transportation, Don Robbins; photograph, badge, registration, A. E. Fleming; booster, Blaine Grey; exhibits and contributions, John Christensen; and golf, W. L. Winter.

Exposition in Biltmore for N.E.C.A. Convention

From an industry and public standpoint the spotlight of this year's convention of the National Electrical Contractors Assn. at Hotel Biltmore, Los Angeles, will be the Electrical Exposition Extraordinary, likewise held under the same roof. A new angle in N.E.C.A. convention activities, this exposition is being put on by the combined efforts of all branches of the industry working through the Electrical Development League of Southern California. The exposition will be held during the entire week of Oct. 18, and permit conventioners to view the latest achievements and devices in this ever-changing field.

Floor arrangements has been decided, with wide aisles and ample booths to show off the equipment. Assignment of space is now being made and exhibitors are asked by A. L. Stone, in charge of the exposition committee, to make their wants known early so as to insure display facilities. Inquiries are to be directed to the Hotel Biltmore, in care of the "Electrical Exposition Extraordinary," it has been announced.

Meanwhile the program committee for N.E.C.A. is completing arrangements for convention program features and addresses. Preliminary announcements of the program are expected by next month.

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Vancouver Contractors' Officers Installed

T. C. Simmons was elected president of the Vancouver Electrical Assn. at its annual meeting recently. Mr. Simmons will succeed A. W. Hunter, who has headed the contractors' organization during the past year. C. B. Jarvis was appointed vice-president and S. F. Ricketts was re-elected secretary. H. J. Sawyer was also re-elected treasurer. In addition to the above officers the executive of the association during the coming year will consist of Earl Dunsmuir, E. Hammersmark, R. Hall, R. G. Wallace, W. M. Mott, J. S. Homersham, G. W. Firth, and R. A. Graham. At the annual dinner of the Vancouver Electrical Association H. J. Sayer was master of ceremonies. Guests of honor at the dinner were Mayor George C. Miller of Vancouver and Mayor Fred J. Hume of New Westminster, both well known figures in the electrical industry in the coast province. Mayor Miller spoke briefly during the evening, urging closer co-operation between Vancouver electrical men and the city electrical department. C. C. Carter, W. C. Mainwaring, C. H. E. Williams and T. C. Clarke also spoke, while Edmund E. Walker was community song leader.

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S. F. Contractors Agree to Wage Increase

Wages for journeymen electricians in the City of San Francisco were raised from $10 to $11 a day under a new agreement signed between the San Francisco Electrical Contractors Assn. and local No. 6, I.B.E.W. Other conditions, including the 8-hr. day, remain the same although the union originally asked for a 6-hr. day. Raise of wage rate to $1.37½ per hr. will cause a revision of labor charges to customers. A raise of the same percentage for helpers is being negotiated.

This agreement brings the three mechanical trades, plumbing, steamfitting and electrical under the same scale of wages, the plumbers and steamfitters having raised the scale previously. A uniform scale for the mechanical trades is held to be highly desirable by electrical contractors. Negotiations also are starting for the establishment of some type of apprenticeship program.

"Little Red Wagon" Available for Shows

The entire West and Texas to the Canadian border has now been covered by Ray J. Larrabee, field engineer of Underwriters' Laboratories, with his little red wagon. The red wagon in this instance is a traveling field laboratory which goes from town to town taking samples from dealers' stocks of labeled cord, wire, rigid conduit, armored cable, flexible non-metallic tubing, etc. Tests are made in the presence of electrical inspectors, contractors and dealers, wholesalers and, where asked, the public.

The field laboratory is equipped with enough apparatus for making flame tests of flame-resisting finishes, copper sulphate tests of zinc coatings, tension tests, flexibility tests, etc. Where a sample taken from dealers' stocks is found defective, extra samples are obtained from the same stock and sent to the Chicago office of Underwriters' Laboratories for countercheck tests under standardized conditions.

Mr. Larrabee has expressed himself willing to display the testing equipment and to conduct tests in conjunction with electrical expositions and appliance shows if requested by industry groups. Not only will the industry benefit from such procedure, but the public who visit such shows will gain a respect for the safety standards policed on behalf of the industry by the Underwriters' Laboratories.

San Francisco Electrical Contractors Assn. has now been operating since May under a voluntary arbitration agreement set up under Sections 1280 and 1293 inclusive of the California Code of Civil Procedure. A. E. Rowe was selected as arbitrator, and R. A. Balzari as alternate. The arbitration plan has been used successfully by a number of trade associations in California.

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ELECTRICIANS at work on Vancouver Island and the lower mainland of British Columbia are affected by the first wage minimum applied to skilled labor by the B. C. Board of Industrial Relations, which became effective July 5. The minimum is 75c per hr.

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SUSPENSION OF LICENSES of 13 electrical contractors, who failed to make proper reports on out-of-city installations, or to comply with other requirements of the State electrical code, was announced last month by the Washington State Department of Labor and Industries. A warning stated that all jobs are being checked, that a report will be required on each.

Sales Parade

NEWS, METHODS, IDEAS, PLANS, COOPERATIVE CAMPAIGNS, RESULTS AND EXPERIENCE IN THE SALE OF ELECTRICITY AND APPLIANCES

An idea of the display possibilities in the glass enclosed spaces on the appliance floor is gained from these preliminary photos taken before the market was opened.

San Francisco Celebrates Opening of New Western Exchange

FLAGS and banners down Market street, an engraved invitation to attend from Mayor Angelo J. Rossi, and a glistening new array of displays herald the opening of the brand new Western Furniture Exchange and Merchandise Mart, at Market and 10th, San Francisco, Aug. 2-7. The event is particularly significant, for not only does it mark the completion of the first large new building since hard times, but from the electrical industry standpoint, it concentrates the merchandise displays of all of the major and many of the minor appliance lines where dealer buyers may see them in one building.

Equally significant is that many of the headquarters for such distributors are being moved into the building along with their displays, and the Electric Appliance Society, Gas Appliance Society, and Pacific Radio Institute join the headquarters of five western retail furniture associations, and the magazine, *Western Home Furnisher* as tenants of its tower floors. Westinghouse Electric & Manufacturing Co. is moving its merchandising headquarters there from 1 Montgomery St., where the remainder of Westinghouse west coast headquarters is housed. C. A. Meier and his staff are now to be found in back of a magnificent display of Westinghouse kitchens, laundries, and appliances.

Among the other electrical manufacturers and distributors with appliance displays which completely fill the fourth and run over onto the fifth floor are:

Apex-Rotarex Mfg. Co.; H. R. Basford Co., Kelvinator, Magic-aire, and Zenith distributors; *Bushnell Sales Co.*, Magnavox, Electro-Acoustic, Jewett refrigerators; *Chanslor & Lyon Stores, Inc.*, Crosley; *Coast Radio Supply Co.*, Emerson phonographs and radios, Samson fans, Sunbeam appliances; *Dunham, Carrigan & Hayden Co.*, American Beauty washers and ironers, Sparton radio; *Easy Washing Machine Corp.; George H. Eberhard Co.*, Conlon washers and ironers, Grunow, Permutit water softeners, Standard ranges; *Electric Kitchen Appliances, Inc.*, Hotpoint; *Eureka Vacuum Cleaner Co.; Frigidaire Div.*, General Motors, Frigidaire and Delco domestic and commercial; *General Electric Supply Corp.*, G. E. appliances, Eveready, Everhot, Hamilton-Beach appliances, Thermador, Toastmaster, Pin-it-up, etc.; *Graybar Electric Co.*, Cory coffee makers, Crawford ranges, Everhot, Graybar, Hamilton Beach appliances, Leonard refrigerators, Majestic, Manning-Bowman, Meadows, Proctor, Royal, Stromberg-Carlson, Sunbeam, Telechron, Thermador, Toastmaster, Wesix; *Albert Groeschel*, Bersted appliances, Eskimo mixer, Speedmaster tea kettles; *Holland-Riegar Corp.*, Faultless washers; *Johnson Motors*, Briggs refrigerators; *Landers, Frary & Clark*, Universal appliances; *Leo J. Meyberg Co., Inc.*, Norge, RCA-Victor, Hamilton Beach mixers, Samson appliances, Wesix, Westinghouse appliances and lamps; *Moore Electric Supply Co.*, Estate electric ranges, Speed-Queen washers and ironers, Stewart-Warner radio and refrigerators, York room coolers, Parker-Frostkist commercial refrigerators; *National Enameling & Stamping Co.*, Nesco cookers, etc.; *Peterson & Vail*, I-C washers and ironers, Southern electric ranges and heaters; *E. J. Pilloid & Sons*, International and Kadette radios; *Remler Co. Ltd.*, radio and sound; *Steiger & Kerr Stove & Foundry Co.*, Occidental ranges; *Stromberg-Carlson Telephone Mfg. Co.*, radio and sound; *Thompson & Holmes, Ltd.*, ABC washers and ironers, Culinaire mixers; L. & H. ranges, Philco radio, Royal cleaners; *Thor Pacific Co.*, washers, ironers, vacuum cleaners; *Westinghouse Electric & Mfg. Co.*, appilances, air conditioning, commercial refrigeration; *A. D. Wunder Co.*, Gaffers & Sattler refrigerators.

In the housewares and lamp division, exhibitiors include: *A. L. Abrams*, lamps; *Alert Lamp & Shade Co.*, lamps; *Baker-Smith Co.*, lighting fixtures, Jewel lamp bulbs; *Colonial Lamp Studios*, lamps; *Continental Sales Co.*, Hammond clocks, Vaculator coffee makers, Utility Toastwell toasters; *Fleming & Niswonger*, Artistic I.E.S. lamps; *Fritz-Levy Co.*, lamps and shades; *Gillan Sales Co.*, food mixers *Golden State Lamp & Shade Co.* I.E.S. lamps; *Jean H. Grambergu* Remembrant lamps; *Wm. P. Horn Co.*, Dominion table appliances; *J. F. Kitterman*, desk lamps; *Kraftile Co.*, pottery lamps; *Cyril Lichenstein*, lamps; *Arthur C. Maryon*, lamps, Durabilt traveling iron, electric logs; *H. L. Michaels*, lamps; *The Miller Co.*, I.E.S. floor and table lamps and lighting fixtures; *Milo Mfg. Co.*, lamps; *Marc S. Salomon*, lamps; *Schiff-Pike-Schiff*, lamps and shades; *Sun Fat Co., Inc.*, chinese pottery lamps; *The Vinton Co.*, health lamps; Dormeyer mixers, Made-Rite toasters, Stern-Brown table appliances, and lamps.

Among the five markets to be held during Aug. 2-7, was to be the Western Radio and Appliance Show, with its accompanying trade dinner, Wed. evening, Aug. 4, in the new auditorium and dining room known as the Mart Club, on the 9th floor "roof" of the exchange itself. In fact the big luncheons each day of the market week will be held in this swank new auditorium, equipped with sound, lighting, movie equipment, and stage facilities.

Appliance and radio trade dinner was to have L. B. Quimby, chairman of the radio and appliance advisory board of the exchange, as chairman, George

C. Tenney, editor of ELECTRICAL WEST as toastmaster, and two strong speakers—Gerald E. Stedman, advertising counsel, Norge Div., Borg-Warner Corp., Detroit, and a regular contributor to *Electrical Merchandising*—subject, "Effective Methods in Appliance Merchandising"; and Will A. Foster, vice-president and divisional director of sales, Borden's Dairy Delivery Co., San Francisco — subject, "The Effect of Modern Home Appliances on Our Changing Habits of Living". Entertainment and high class music were also scheduled for the affair.

Exhibitors were rushing to completion their displays in the new glass-enclosed partitions on the fourth and fifth floors as this issue went to press. Ample lighting, radio plugs on an antenaplex aerial system, convenience outlets aplenty, and other facilities provide each space with the finest equipment for display purposes. The fifth floor is a combination small appliance and kitchen housewares floor, while the fourth is exclusively devoted to appliances.

Details of the opening, the market, and pictures of exhibits will be published here next month. Likewise there will be a description of the electrical installation in this building, itself unusual to meet the unique conditions of a wide variety of exhibits, all separately metered.

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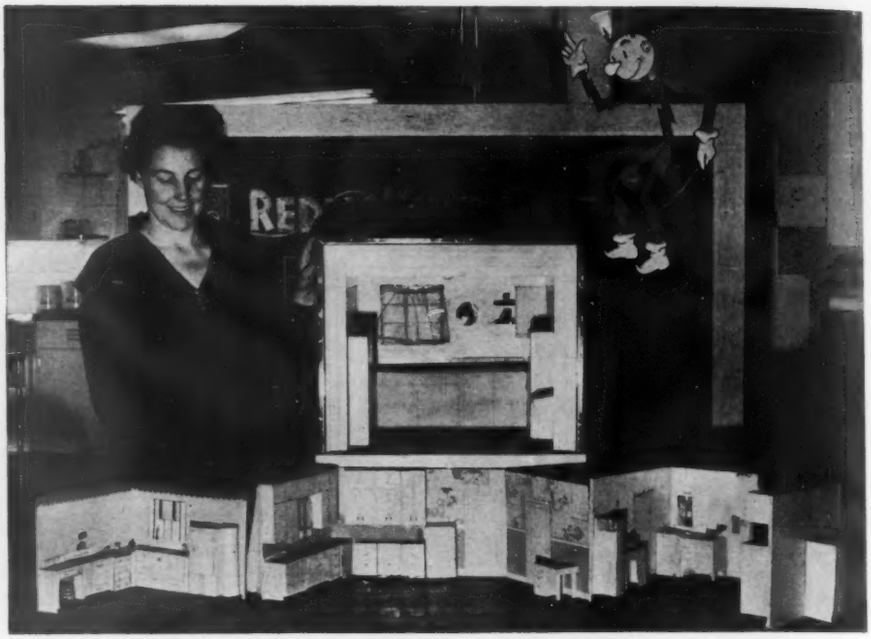
Our Cover—Madera, Best Lighted Town

Practically every type of athletic field or playground in the city limits of the city of Madera, 5,000 population, thriving San Joaquin Valley town, has been lighted during the past few years. The football field shown on the lower right of the cover was financed by public subscription, with lighting units supplied by the student body. Installed capacity of 72 kw. makes it one of the best lighted high school football fields in the valley.

Tennis courts at Lincoln Grammar School are illuminated with five 1,500-watt suspension type lamps over each of the two courts, at a minimum height of 30 ft. A pay meter provides revenue which pays for energy consumed. The outdoor swimming pool at lower left of the cover is equipped with 8 kw. in border lights which illuminate both dressing rooms and pool, together with seven 500-watt overhead lights over the pool for night swimming; a total of 11.5 kw.

The softball field at upper left was financed by sale of so-called baby bonds, the grounds being provided by city school authorities. Installation was made during the middle of the past summer season and sufficient revenue was derived from gate receipts to meet current expenses and pay off some of the outstanding bonds, leaving a surplus on hand for additional bleachers. The field is equipped with thirty 1,500-watt units on six 80-ft. poles. Outfield ceiling lights were installed this season, bringing the field up to a total of 60 kw.

Madera has been successful in these projects because of full cooperation between power company representatives, lighting engineers, contractor dealers, wholesalers' and manufacturers' representatives. Design of installation was worked out by J. E. Hammond, head of San Joaquin Light and Power Corp. lighting department, and A. E. Conrey, district lighting engineer.



Miss Nancy Finch, home service director of the Utah Power & Light Co., showing some of the kitchen modernization models made by members of her staff

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Utah Girls "Remodel" Their Own Kitchens

"Now, here is a model of my own kitchen," says one of the home service girls of the Utah Power & Light Co., in discussing kitchen modernization before a woman's club or even a single customer. With that statement she displays an actual model, or a set of plans. The effectiveness of this kind of demonstration is evident. All of the company's 48 home service girls are capable of doing just that.

The ability of these home service girls to talk intelligently and fluently on the subject of kitchen planning grew out of an idea developed by Miss Nancy Finch, head of the company's Home Service Department. She initiated a kitchen modernization contest for her staff. Before the contest was over it turned out to be a complete study of modernizing principles and their application to one particular kitchen—each girl's own.

Each girl was required to undertake the modernization of her own kitchen, wherever that happened to be. She was required to present it as it was originally, and then to draw up plans for its remodeling covering color scheme, floor arrangement, and financing. Cost of remodeling was not to exceed $1,000.

No specifications were set down as to form. The result was many novel presentations. Some of the girls drew up regular architect's plans with tinted drawings of the modernized kitchens to show color scheme and elevation. Others used clippings from magazine pictures together with samples of materials. Several girls made models, using wallboard and cardboard or cork replicas of equipment. Designs included necessary structural changes, selection of equipment to be installed at once and other appliances to be added in the future, as well as arrangement for kitchen efficiency. Adequate wiring and adequate illumination was emphasized.

Response was enthusiastic. The girls reported that having to figure cost and to apply principles to their own condition made their understanding of the work much more practical. No longer would they glibly advise the moving of a sink or the blocking up of a door without due consideration for cost, having learned that plumbing changes and carpenter bills are expensive. Because of their experience, all 48 of the girls are now able to discuss kitchen planning with the utmost confidence.

Two Radios for One Campaign a "Natural"

SMART way to solve the radio trade-in problem is contained in the unique "Two radios for the price of one" advertising and sales campaign which started this month in San Diego county under the sponsorship of the Bureau of Radio and Electrical Appliances. First announcement of the unique campaign was made at the fourth annual Bureau banquet at Plata Real, U. S. Grant Hotel, July 9, where an unusually large attendance of dealers and salesmen congregated to celebrate last year's sales victories and to hear of plans for the future.

Purpose of this new radio promotion is to dislodge from living rooms of thousands the antiquated "highboy" models that really have little in common with the modern radio. According to J. Clark Chamberlin, secretary-manager "In the past, dealers have been forced to take these models in trade and they actually have no value on the present market. Our point in this campaign is that such radios are to be reconditioned and reinstalled in some other room of the house, during this 30-day campaign. Thus, with the purchase of a new 1938 console model radio for the living room, the purchaser is getting two for one by virtue of the fact that the old radio, probably in disuse, or at least badly needing attention, is to be put in condition without charge.

"Actually, dealers will probably not spend any more in repairing and reinstalling the old radio in some other room of the home, than they would allow and lose on a normal trade-in. Thus, it is a good deal both ways." He further points out that in such situations where the old radio cannot be repaired within reason no obligation to follow through is mandatory but that practically all stores have many old models on hand and in the event customers require it, and their own radio is hopeless, one of the old models on hand can be presented.

In addition to copies of large space newspaper advertisements, attractive tie-in window cards were presented to the dealers at the meeting. Other advertising aids such as billboards, street car cards, and radio announcements will likewise be tied into the month's advertising campaign. Dealers are particularly urged to tie their own advertising to the "Two Radios for the Price of One" advertisement the Bureau is running and make attractive window displays using the show cards provided.

Radio Ordinance Passed

Sincerity of the radio dealers' support of the new radio interference ordinance was effectively demonstrated to the Interference Enforcement officers by having them in attendance at the banquet, where they could hear the earnestness with which the radio industry has sponsored the ordinance. These men were told that the industry was looking to the officers for a cure to a serious menace.

The Bureau originated and had printed several thousand cards on which suspected causes of interference can be made. These are being distributed by radio technicians cooperating closely with the Bureau. Dealers and technicians are asking people with complaints of troublesome interference to fill in a card and mail it to the "Radio Interference Enforcement Officer, City Hall," from which it will be given immediate attention. Interference of major importance will be tackled first until publicity can be given to the public regarding many troublesome and annoying minor causes of radio interference originating in home wiring and use of home devices.

Another feature of the banquet was a presentation of refrigeration advertising and promotion for the next month, together with a sales analysis of refrigerator saturation, sales volume compared with other years, comments on constructive and destructive selling trends and discussion of reasonable selling expectations for the balance of 1937. President Brunelle presented the radio interference matters and the inspirational speaker of the evening was Neil Nettleship.

●

Reno Store Annex

Taking the store next door, Nevada Electric & Machinery Co., Reno, turned it into this attractive appliance display annex

"Take Irk from Laundry Work"

TO the tune of "Take the Irk from Laundry Work" electrical appliance dealers, distributors and the Pacific Gas & Electric Co., cooperating through the Electric Appliance Society of Northern California, will concentrate on an ironer campaign from Aug. 25 to Sept. 25. Details were developed at a meeting July 23, at Society headquarters in the new San Francisco Furniture Mart. A questionnaire sent to dealers throughout Northern California had revealed an overwhelming desire for an ironer campaign and very little for a combination washer and ironer drive. Ninety-eight dealers replied, 89 of whom wanted an ironer campaign, 8 a washer and ironer campaign, and one was undecided.

As an inducement to the buyer, a $5 coupon, applicable on any electrical ironer over $70, will be offered by dealers through direct mail and store advertising. Aug. 25 was selected so that the coupons could be sent by dealers with their August bills, or otherwise distributed to get the greatest circulation among customers. The coupon will be applicable on 1937 models, the wholesaler standing $1.50 of the allowance, retailers the remainder.

In support of the campaign the entire Society will launch an extensive advertising campaign. Three 60-in. advertisements will be run in 287 newspapers, daily and weekly, throughout September. Billboards, radio announcements, on "California Tales," billstickers, a contest in *P. G. & E. Progress*, display cards for the dealers, clip sheets for the newspapers, bulletins to dealers, radio plugs, and lantern slides for movie theatres will be provided.

In addition to this, in 35 P. G. & E. offices, ironer demonstrations will be conducted by hostesses and a free towel given to those sitting down and operating the ironer. This feature will be conducted at P. G. & E. offices only.

A salesman's contest will be arranged in each division according to local desire, the Society furnishing one half of the prize money, the local unit or dealer supplying the other. One condition for the salesmen's contest is that each contestant must give a demonstration test on the ironing of a shirt.

Slogans for the campaign have quite a swing. The main slogan worked into an emblem will be "Take the Irk from Laundry Work with a Modern Electric Ironer." Contrast will be provided by showing the figure of a woman doing ironing the modern way and that of another woman, tired at the end of a day's ironing, putting away the old ironing board.

One ingenious display theme is a continuous strip of muslin which can be run over the roll of an ironing machine by means of the ironer itself in a window or store display. It contains the following sales story: "Take the Irk from Laundry Work—on ironing day, iron this modern easy way—sit down, take it easy—let the machine do the work—you get better ironing in half the time——you can do plain or fancy work just like child's play—no more hot and heavy hand-iron toil—end forever ironing-day fatigue—gone forever aching arms, breaking back, throbbing headaches, weary limbs—sit down—relax, finish the job with a new electric ironer—simple—easy—fast—certain—better—a joy to operate—Take the Irk from Laundry Work—sit down—take it easy—finish the job with a new electric ironer."

●

Bugaboo Chasing Range Campaign Started by Edison

A "Back to Work" movement among range dealers of the Southern California Edison Co. territory will start Aug. 2 and run to Sept. 10, according to H. C. Rice, merchandise manager. A series of breakfast meetings beginning July 27 will be held with dealers throughout the system, in each of which one of the 6 supervisors, in their respective divisions, will present a program of sales activity which will have for its object the overcoming of the bugaboos of superstition, misinformation, and prejudice regarding electric cookery.

Support for the campaign in power company effort will be shown to include a wiring allowance (which has amounted to $700,000 since Nov. 1933), advertising in 170 newspapers, billboards, use of radio, stories in *Electrical Times*, financing assistance, monthly sales reports, and free service after the guarantee period. Likewise will be shown the advantages of the company's work for Red Seal homes, wiring certificates, work done by the home economists, dealer contact men, cooking schools, advertising to specialized groups, printing of a range sales manual, and the efforts of 12 air heating men selling all-electric homes. It will also be shown that the lowest rate available for full use customers is a distinct selling advantage.

The homemaker is interested in comfort, convenience, livability and charm, it will be pointed out. Formerly the whole family lived in the kitchen. Now only the mother spends one-third of her time in the kitchen. The modern electric kitchen provides cleanliness, healthfulness, better results and is time releasing. Similarly it will be proved that 240,000 Edison consumers have refrigerators, 240,000 own their own homes, 400,000 own automobiles, and spend $100,000 per day for gasoline for family use only, $60,000 per day for cigarettes, $45,000 per day for milk, $30,000 per day for electricity for domestic use.

FLASH—Aug. 15 marks the start of the most spectacular range campaign Los Angeles has ever known, according to priliminary word from Bureau of Power & Light. Sixty pages of ads, street car banners, radio and other publicity will herald the benefits of electriclean cooking so that dealers may follow up the barrage with a strong sales drive—details later

Dealers will be urged to compile their own prospect lists from refrigerator owners, Red Seal homes, to canvass present users, consult with grocers, bakers, butchers and candlestick makers, and to use a range themselves. They will be urged to canvass continually, to tie in with Edison ads, send out direct mail, have an adequate floor display, prepare a convincing and organized sales story, and to tell it to at least 5 prospects a day.

How questions to the effect that electric ranges are expensive, slow, or expensive to operate as well as 45 other questions may be answered from the sales manual, will be shown.

"Next to an Ambitious Man Without a Job—the Most Pitiful Sight is an Untrained Salesman," the groups will be told at the climax of the sales meeting.

●

Operating Cost Per Month of Additional Electrical Appliances

Based on Residential Rate - TARIFF SCH. 5:
First 40 K.W.H. @ 5¢ = $2.00
Next 100 K.W.H. @ 3¢ = $3.00
Next 100 K.W.H. @ 2¢ = $2.00
Over 240 K.W.H. @ 1¢ per K.W.H

ESTIMATED ADDITIONAL COST PER MONTH FOR AVERAGE USE OF:

IF BILL AVERAGES	ELECTRIC IRON 45¢	ELECTRIC IRONER 70¢	ELECTRIC CLOCK 5¢	DISHWASHER 75¢	HEATING PAD 15¢	SUN LAMP 5-1 35¢	SUN LAMP 5-2 25¢	MIXER 50¢	COFFEE MAKER 50¢	RADIO 75¢	SEWING MACHINE 50¢	TOASTER 75¢	CLEANER 75¢	WASHER 75¢	REFRIGERATOR 60¢	DOMESTIC PUMP 40¢	I.E.S. LAMP 100 WATTS 30¢
$1.00	45	70	5	15	15	35	25	5	50	75	50	75	75	15	60	40	30
$2.00	27	42	6	9	9	21	15	6	30	45	3	24	9	9	120	90	54
$3.00	27	42	6	9	9	21	15	6	30	45	3	24	9	9	120	90	54
$4.00	27	42	6	9	9	21	15	6	30	45	3	24	9	9	120	90	54
$5.00	18	28	4	6	6	14	10	4	20	30	2	16	6	6	80	60	36
$6.00	18	28	4	6	6	14	10	4	20	30	2	16	6	6	80	60	36
$7.00	9	14	2	3	3	7	5	2	10	15	1	8	3	3	40	30	18
AVERAGE MONTHLY USE	9	14	2	3	3	7	5	2	10	15	1	8	3	3	40	30	18

Chart furnished Puget Sound dealers to show customers the operating cost of various appliances as governed by customers' use of electricity

To MODERNIZE and electrify cooking equipment used in hotels, schools, hospitals, clubs, etc., a Commercial Electric Cooking Council has been organized jointly by the Food Service Equipment Section of NEMA and the Commercial Sales Subcommittee of Edison Electric Institute.

Counter cooking equipment will be the subject for the first promotion. Pointing out that among customers are 50,000 worthwhile restaurants and 35,000 drug stores with lunch facilities, the council plans first to issue a plan book, direct mail pieces and a news sheet.

●

Rate Handbook for Idaho Dealers Issued

To enable dealers and their salesmen to talk intelligently and comprehensively regarding the cost of operating various electrical appliances, the Idaho Power Co. has published a small handbook explaining in detail its rates and their application. Copies have been placed in the hands of all dealers and their sales forces in the company's territory.

Each rate schedule is discussed separately, and there is an example showing how various kw.-hr. consumptions are computed. A table taken from a Federal Power Commission survey compares Idaho rates with those of other states. A second tabulation indicates the savings possible by the addition of major appliances which permit the consumer to secure a lower schedule.

One page is devoted to adequate wiring and its effect upon the efficient and convenient operation of appliances. In addition, all of the rate schedules applicable to residential service as well as the two basic commercial schedules are printed in full.

The company's sales department reports the booklet extremely helpful in clearing up misunderstandings.

●

Appliance Cost Card Supplied Dealers

Dealers in the territory served by the Puget Sound Power & Light Co. have been supplied with a simple table which shows the average operating cost for any given appliance based upon the average monthly bill which the customer pays. The table was devised by R. W. Clark, merchandise manager, for the purpose of showing prospective buyers just what the additional cost will be for any given appliance they are considering. Incidentally, it demonstrates how operating costs go down as the use of energy increases.

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RADIOS
FOR THE PRICE OF ONE
Feature these points in your ads
THAT OLD RADIO RE-CONDITIONED MEANS THAT...
Here's the BIGGEST OFFER ever made
WITH EACH PURCHASE OF A NEW 1938 CONSOLE RADIO (factory shipments just received) . . . WE WILL THOROUGHLY RE-CONDITION AND RE-INSTALL YOUR OLD RADIO FREE
You've been wanting perfect radio performance for a long time... world-wide reception that gets in on the original broadcasts of red hot news; the pure, rich tone qualities and hair-line tuning that is found only in these newest instruments... plus a modern design that will fit the type of furniture your best room affords.
See ANY RADIO DEALER for the details of this attractive offer which is made for a limited time only.

Solutions for Trade-Ins

• Recondition . . .

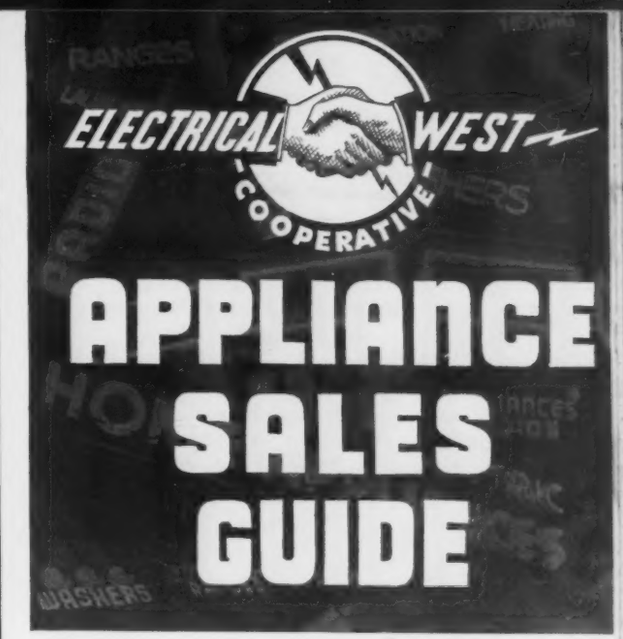
Cleverest solution to the problem of trade-ins is that suggested in the ad above. Either with other radio dealers in town or as your own store promotion, offer buyers the proposition that you will put their old set in shape, if they buy a new console from you, and install it in some other room in the house. Nearly everyone can use more than one set—children can have one to hear their own serials and programs—mother can use the old set in the sewing room—put it in the bedroom or guest room to entertain anyone who may be ill or visiting—Dad can use it in the workshop or den—or have it handy to take outdoors on Saturday afternoons to hear football broadcasts while gardening. As a dealer you will not have to spend any more to recondition the old set than you would lose profit on a trade-in that will gather dust and may never sell in your back shop. In case the old set is hopeless you can still make good—give one of your former trade-ins in its place.

• Institutions . . .

One big department store in San Francisco runs an annual sale, offering to give the traded-in radio to Blindcraft, an institution for the blind. There is some similar institution in your community—a home for the aged, hospital, farm, orphanage, or other similar charity that can use old radio sets and thus get them off the market. Old sets take space in the store you can use more profitably to display new models.

• An Exchange . . .

If the saturation in your town is high get together with other dealers to establish a second-hand reconditioned radio exchange or market, through which to clear them. This will take them from your own floor so that you can concentrate on profitable new sales, and provide a place where the low income, cheap buyer may go to shop without wasting your time. A "Used-Car" lot idea.



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Money Saving, Money Making

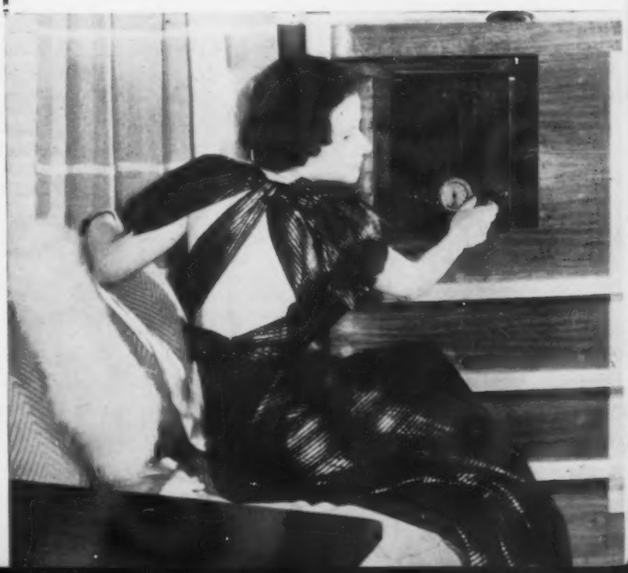
RADIO IDEAS

AUGUST, 1937

RADIOS

Miniature Sets Have Their Place

Many dealers feel only disgust for the small, low-priced, mass-produced radio set, saying that it spoils the console market. Yet this type of set has its place in merchandising just as other mass-produced articles have in other lines. Colorful in white and colored moulded plastic cabinets these little sets make attractive attention-getting displays. They bring buyers into the store. They provide an opportunity to get prospects and to sell up to better sets. Profit on them may be short, but so is profit on sugar, yet volume makes it worth carrying. Good makes give two or three years service, and purchasers do not expect more at the price, so they buy another or better set next time.



NO. 8A THE RADIO

SHORT SALES TALKS
That hurdle Sales Resistances

★★ AS THE RADIO has become a commonplace item in the home, the days are over when the electrical appliance dealer can expect the prospect to walk into the store and "take one away." But the profits to be made from radio sales are well worth the effort necessary to achieve a good turnover, because this appliance, above all others, offers entertainment for the entire family. Hence the selling arguments advanced should stress this advantage over all others. There are, however, methods as outlined on the preceding and subsequent pages which will develop good prospects for the sale of new radios.

Because so many households already have a radio, good salesmanship is necessary to convert the present owner into a profitable sale. This can be done advantageously by taking advantage of the improvements in tone, reception and appearance of the newer models. It is necessary to create desire for better quality of home entertainment and persistently sell the extremely low cost of having this wealth of talent and instruction in the home. On the other hand, the resistances to the sale that the prospect can muster may look insurmountable to the inexperienced or timid salesman. Here are the common objections that Bill Smith, the master salesman, had to overcome. At least one of these will come up in almost every sales talk. Study them and then apply the principles which have worked successfully for others to build more profit from your radio line for you.

When the prospect says—

Prospect: **"We have a good set and are very well satisfied with its operation."**

THIS is the signal for Bill to put forth his best selling efforts because it is his job to sell the idea of a new set by showing the advantages of the new set over the old. Bill knows that no matter how good the prospect's present set is, the rapid progress in receiver development makes the new set superior. However, he must use extreme tact so as not to antagonize the prospect and "win the argument but lose the sale." Throughout his sales talk, note that Bill is selling quality because he judges that the satisfied owner must be using his set regularly. There is no use wasting time selling such a prospect on home entertainment itself but there is a great need to sell better home entertainment.

BILL: "I'm glad to hear that you are satisfied with your set, Mrs. Blank, because then I know that you are getting real enjoyment out of it. That's why I would like to have you try one of these new models. You know, it is surprising just how many improvements are developed each year. Of course they aren't so noticeable until last year's set is played alongside of the new model but the ear certainly notices the difference. There are several reasons for this, of course. Every year the designers learn more about sound reproduction. They find out that a slight change in the curve of the tone chamber gives a better tone, that a modification of the electrical circuits permits greater realism in reproduction and best of all, with this new and more convenient tuning, you are assured of maximum reception of the broadcast wave in its full tone and not a bit distorted by the fractional part of an inch the dial may be off the right point. These add immeasurably to your enjoyment as a listener.

"The experience with automobile radios in the past two years also has taught methods of reducing static or interference to a minimum. These new developments all would add to your pleasure as a listener even if the art of broadcasting itself had not been greatly improved in the past year or so. The big stations have gone to great expense in modernizing their equipment to send out radio waves that make possible a far better quality of reception. These new sets are designed to reproduce these impulses into sound waves that have all of the quality and timbre of the original wave. That is something that even the best of the sets of two or three years ago could not do and it is a reason why a new model like this one is in demand by those who want the best in home entertainment. May I send it out?"

When the prospect says—

Prospect: **"How much will you allow as a trade-in allowance for my present set if I take this one?"**

IN ABOUT 95 per cent of the cases, this situation arises. It is well to be prepared to meet it in every case. It is difficult to tell a prospect that her old set is worthless from a resale standpoint and still keep her interest at a high enough pitch to close the sale without a trade-in. But Bill Smith closes a large percentage by selling the "two sets per home" idea.

BILL: "How much can we allow you on your old set? I am embarrassed to tell you how little value an old set has for resale in comparison to these new models, with their many refinements that bring you so much more in trueness of tone and clarity of reception. Let me make a suggestion. Many times, no doubt, you have wished to listen to one program while some member of the family wanted just as badly to listen to another. Why not keep the old set in some other room—a bedroom perhaps, or in the den, or basement playroom or in the workshop? Then you can enjoy really

fine music, in all of its rich color and quality in your living room where you entertain your friends, and if you or some other member of the family were busy in another part of the house and did not want to miss a favorite serial or radio feature, it could be done without inconvenience to anyone in the family, and with pleasure to all. Won't that solve the problem and still afford you the opportunity to enjoy this fine new set at its best? Why not let me send it to you tomorrow?

When the prospect says—

***Prospect:* "We don't listen to the radio very much any more and our old set is good enough for the little we use it."**

THERE are almost endless variations to this sales resistance. In some localities, summer static may be the reason. Other prospects object to the programs themselves. Too much advertising or too many political speeches may be given as the reasons for losing the radio listening habit. Bill has studied this type of prospect and knows that the answer is in giving a prospect a wider selection of programs than is possible even with the present-day variety on the air. He figures that the time is coming when more and more radio-phonograph combinations will be sold. Prospects that make a statement like this are ripe to be sold this particular appliance. And it is a sale which will bring the dealer more profit than a half dozen table models.

BILL: "I appreciate that there are many other demands upon our time these days and that when you do sit down to enjoy home entertainment the kind of program you want to listen to may not be on the air. Or conditions may make reception difficult. That's why I would like to show you this new radio-phonograph combination. It's a really fine musical instrument. It more than doubles the enjoyment you get out of this particular electrical servant.

"It will bring you world-wide reception of the finest radio programs or if you feel in the mood for a particular type of music, it will play you a program of your own selection. Haven't you often wished that you could make an evening's program just to suit yourself? With this instrument you can do just that. Too, it provides an easy means of entertaining your guests, particularly for parties because with it you can play choice selections from the operas or, if you want to dance, the latest and most popular hits from the country's finest dance orchestras uninterrupted by talk or announcements.

"This combination is the finest and most versatile of home entertainers, always ready to do your bidding and working for a few cents a month. It will open up a whole new field of enjoyment and pleasure for you and your family because its sensitive high quality reception as a radio receiver will bring in the radio programs you want to hear with all the full, rich tones of the original broadcast. It will insure you against interference and static. Its same full-range amplifier reproduces the records you select with all their superb tone qualities so faithfully that it is difficult to believe you are not before the orchestra itself. Once you have had one of these fine instruments in your home, you will discover just how much it can enrich your spare hours with the finest music in the world. May I send one out so that you can see for yourself just how wonderful an addition it is to modern living?"

When the prospect says—

"Our old set isn't much good but it will do for awhile. Television sets will be on the market soon and I wouldn't want to buy a new set until after I have seen what they will do."

BILL: "I appreciate how you feel about that Mr. Blank. In fact, just for my own information I checked up on television receivers not long ago and found out that the television engineers think it will be several years before a satisfactory model can be placed on the market. You see, there is still much development work to be done and the Government hasn't even provided the wave bands upon which commercial television will operate. That in itself will take a long time in arranging, longer than you will want to wait. In the meanwhile, why not give yourself the pleasure of modern radio reception with one of these new models that bring programs to you so realistically that you can almost see them. Improvements have been so numerous and the quality of reception so markedly improved that there really is no comparison with the sets of a few years ago."

HERE Bill describes some of the improvements mentioned in example 1, always remembering that he isn't selling tubes and circuits but a device that will bring the prospect entertainment and added pleasure.

CALIFORNIA OREGON POWER CO. · PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. · PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. · IDAHO POWER CO.
NORTHWESTERN ELECTRIC CO. · WASHINGTON WATER POWER CO.
UTAH POWER & LIGHT CO.

HOME ATMOSPHERE

best for Demonstration

Home demonstrations, from the customer's viewpoint, are much to be desired, but to dealers they represent expensive selling and many trade abuses. Yet since purchasers of a radio want to hear how it sounds in their own home, the wise dealer will provide a little "home" in his shop where the prospect can be taken to hear play the set in which she is interested. A room with simple but homey atmosphere, sufficiently sound proof to keep out street and store noises, with a representative model of each class of set carried in stock, hooked up to a good aerial for demonstration; comfortable chairs to relax and enjoy the music, will sell more sets than just the open floor display and demonstration. Salesmen will be less interrupted in their sales talk, customers can ask questions and feel that their own ideas are listened to, and more satisfactory sales will result.

. . . SALES POINTS . . .

Radio Console . . .

A beautiful piece of home furniture
Enhances the appearance of the room
Pride in its modern decorative effect
World's greatest talent brought home
Enjoy entertainment in home comfort
No need to dress for the opera
Complete variety of choice in new sets
More realism in tone and quality
Can reach out further for programs
Unusual features by short wave
Lonesomeness banished with a radio
Routine tasks easier while listening
Keep in touch with world's events
Interest in police and airplane short wave
News summaries save time and eyesight
Valuable information by authorities
Health and beauty information free

Miniature Set . . .

Radio in any room, at any time
Take along when traveling, vacationing
Ideal when living in hotel or rooming
Decorative note in room furnishings
Fits into smaller space, such as bookcase
A fine kitchen companion while getting meals

Auto Radio . . .

Can't miss favorite game or broadcast
Bring your programs with you everywhere
Picnic with music in the out-of-doors
Dreary long rides made entertaining
Music in the moonlight—romantic
Can't read news but can listen to it
Less hurry if the ride is entertaining
Keeps you awake on long night drives
Discover programs you never heard before

Phonograph Combination . . .

Your own choice of programs at will
Programs suit your convenience in time
No talk or advertising to distract
Recorded music usually better balanced
Freedom from static or interruptions
Quality of music perfect every time
Can repeat a favorite number if you like
Pride in building up a record library
Artists long since dead live again
Adds gracious touch to social occasions
Dance to best orchestras' best selections
"Request performance" for you at command
A fine influence for home culture

Silent Radio

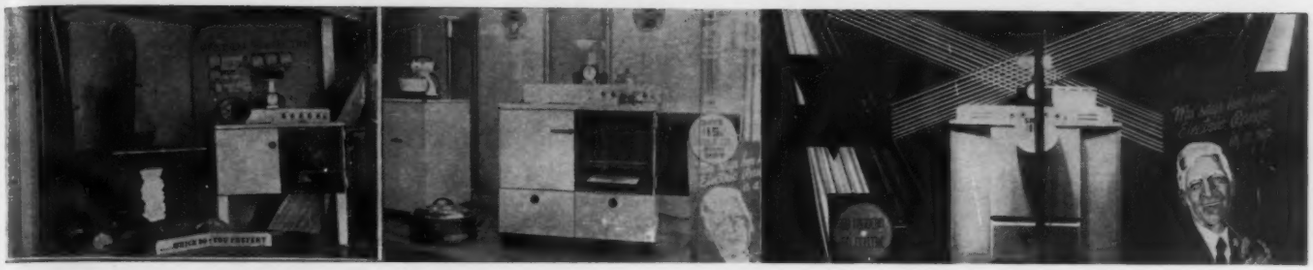
Can hear program without disturbance to others reading, talking, or sleeping

DISPLAYS AND ADS

- Backgrounds, cut-outs, show cards, display pieces of such fine, bright appeal are available from manufacturers that unless the dealer wants to splash with something special of his own it pays to use this material. It can be used in the window first, moved into the store, and later individual pieces of it can be grouped in different combinations to create a new effect.

- Where a dealer wants to make a display of his own, it is wise to *suggest* what few of the prepared backgrounds do—the comfort of listening and relaxing to radio entertainment *at home.* With a few pieces of other furniture show how the new set dresses up the home—this is a *stronger appeal now than it used to be.* Buying is done more on style and appearance of the set at home.

- Even if you can afford little for advertising, spend that little to keep your name repeated to the public. Decide which is best for you—spot announcements, phone directory, radio page, handbills, letters. Use the "sales points" above in your ads.



Contrast was used in the window of Rex Hardware Co., Petaluma. The old wood and coal stove was labeled "Get Rid of the Old Stove—Dirty, Hot, Slow, Expensive, Poor Results." On the electric range read, "Change to Miracle Cooking—Clean, Cool, Fast, Economical, Better Results." A sign in the center was designed to get action. It read, "Which Do You Prefer?" This summary of sales advantages and old stove disadvantages made it the strongest selling window. Center, is the window of Empire Electric Shop, Santa Rosa, attractive and clean. It contained both range and water heater and showed a small appliance plugged in on the range. Right, most attractive display was that of North Bay Electric Works in San Rafael which made the range the center of attention

Dealers Awarded Prizes in Range Campaign

Culmination of the successful range campaign carried on in the North Bay division of the Pacific Gas and Electric Co. by electrical dealers was the awarding of prizes to the three dealer establishments submitting evidence of the best all-round performance in the promotion of the sale of electric ranges. Rex Hardware Company, Petaluma, California, was awarded first prize of $25, Empire Electric Shop, Santa Rosa, second prize of $15, and North Bay Electric Works at San Rafael, third prize of $10, by the awarding committee.

Called by A. L. Walker, sales manager, North Bay division of the P. G. and E., the "Smart Dealer's Award", merchants were asked to submit information and exhibits showing their effort in the campaign. A picture of a window display, copies of newspaper advertisements, data as to store demonstrations and the publicity given to them, use of the P. G. and E. wiring allowance, and results in the number of sales and prospects developed were tabulated. Prizes were given for originality in newspaper ad writing, for cooperative activity, for sales value of the window displays, and for display of ranges in the store, and on P. G. and E. office floor.

The winner, Rex Hardware Company, staged a unique electrically cooked dinner at Two Rock Social Hall, May 13. Mrs. Grace Bushey, Home Economist of the P. G. and E. Co., was obtained to prepare the dinner and to show the advantages of electric cooking. A. L. Walker and Gene Cuslidge of P. G. and E. Co. were asked to participate and put on a skit for the entertainment of the visitors.

Judges in the contest were W. A. Cyr of Electrical West, B. W. Reynolds, manager Electrical Appliance Society, and Chad Hulbert, display manager, P. G. and E. Co.

In presenting the campaign contest, Walker emphasized the Webster definition of the word "Smart" as "Quick in thought and action; bright, brisk, clever, vigorous, emphatic—Be Smart."

●

Graybar Man Holds Salesmen's School

There will be no dearth of sales people trained in the art of selling electrical appliances in the Portland territory if Carl Sundland, of the Graybar Electric Co., continues his voluntary training work. Already two classes have been graduated from the voluntary sales training school which he started so as to be able to furnish his dealers with experienced sales personnel.

His technique is to gather a group of prospective sales people together and then work with them for two weeks. The class meets four days a week, the first three days being devoted to general principles of salesmanship and the remainder of the time to special training in electrical appliance selling. His last class consisted of some 25 men from the graduating class of the state university. Thus far, all of his trained people have been placed with both dealers and the utilities applying for the services of the men who have completed the course.

●

Beverage Coolers Find Ready Market

A splendid example of how sales can be run up by appreciating the customers' problems and following through with aggressive selling is offered by George Belsey Co., Ltd., Los Angeles, which found that 10 carloads of General Electric beverage coolers were not enough to satisfy its energetic sales force. T. H. Chamberlin, commercial department manager, reports sales in May were near $60,000, with even more in June.

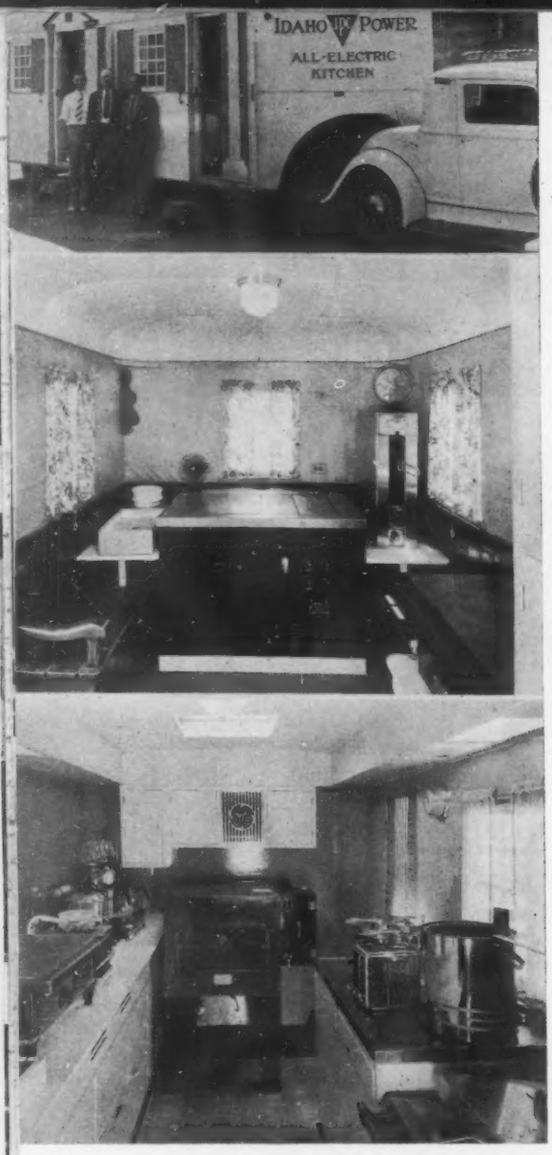
Numerous liquor stores and markets testify to the distributor's looking ahead to ultimate use. George Belsey company encourage installation of units in well-exposed places, thus inviting the purchase of cold drinks rather than forcing customers to demand them. To this same end the distributor arranged with a local Neon manufacturer to sell Neon signs reading "Ice Cold Drinks" for $55 on the usual terms to purchasers of G. E. equipped Undabars. The distributor neither handles nor takes a profit on the signs but uses them in selling the idea of effective merchandising. The wisdom of going after all kinds of prospects was proved by sale of a beverage cooler installed at the gasoline pump island of a large superservice station.

●

WITH 588 UNITS SOLD during the final week of the campaign, the sales department of the Puget Sound Power & Light Co. sold 2,361 water heaters, ranges and refrigerators during an 8-weeks' president's record campaign, which ended early in July. Quota for the campaign was 2,200 units. Interesting feature of this year's drive was that this volume was sold with 45 salesmen, compared with 70 salesmen during a similar campaign in 1936. The Everett district won the president's plaque, which is awarded annually to the district making the highest percentage of quota during the campaign.

●

FEATURE of a recent sales meeting of the Twin Falls-Jerome Division of the Idaho Power Co. was a verbal demonstration in the improvement of sales presentations during the last five years. Back in 1932 R. E. Gale, then sales manager of the division, induced several of his salesmen to record their sales stories on phonograph transcriptions. For the recent meeting new transcriptions of the 1937 type sales stories were made by the same people. Both sets of records were played for the purpose of contrasting the two types of sales stories and demonstrating the improvement which has taken place.



R. A. Hogue, D. Nelson, and O. C. Mayer and the Idaho Power traveling restaurant equipment trailer—with two views of the interior arrangement

●

RANGE AND WATER HEATER CAMPAIGN of Washington Water Power Co., in which trade-in allowances of $25 and $7.50 respectively were offered, closed July 3, with late reports indicating sale of 595 electric ranges and 541 water heaters from April 12. Of these totals, dealers sold 371 ranges but only 83 water heaters. Popular demand and shortage of stock in some cases forced extension of the offer from June 14 to July 3. The campaign will not be repeated during 1937.

●

HIGHEST ELECTRICAL MERCHANDISE SALES in the history of Seattle City Light Department were made in the month of June, with electric ranges, water heaters and refrigerators showing a consistently sharp sales advance since the first of the year, Sales Manager P. C. Spowart reported.

Take Electric Cooking to the Restaurants

A positive way to see 95 per cent of the restaurant owners is to take an exhibit directly to them. Idaho Power Co., Commercial Division, did this in 25 towns over a period of two weeks. Restaurant owners only, were encouraged to visit the coach—the general public was not. Main objective was to acquaint restaurant people with electric cooking equipment; many of them having the impression that electric cooking equipment is only of the domestic type. Second objective was to show the company's own employees the equipment available. Off-shoot of the program was closer contact with prospects, establishment of recognition for electrical cookery, and the development of future prospects.

The effect of touring the territory last year was to speed up sales from four to eight months sooner than they would normally have been made. A total of 450 kw. in sales was made at the end of the first six-month period, a 100 per cent increase over the similar period of the previous year. On its second annual tour the coach will carry a chef experienced in electric cookery who can answer prospects' questions. In the picture, left to right, are R. A. Hoge, Boise Division, commercial salesman; Don Nelson of Dohrmann Hotel Supply Co.; and O. C. Mayer, commercial and industrial sales manager, Idaho Power Co.

●

Utah Dealers May Join Sales Meetings

With the announcement by Sales Manager W. A. Huckins that 113.6 per cent of all E.A.R. quota for the first half-year had been attained, sales superintendents from all quarters of the Utah Power & Light Co. territory settled down to a busy two-day conference in Salt Lake City, July 8-9.

Among interesting conclusions developed out of field experience were: (1) Regional meetings of utility salesmen can profitably be expanded from time to time to include dealer salesmen; (2) Active campaigning of any appliance will bring results regardless of season; (3) The campaign method of selling invariably produces highest results; (4) Sales force turnover can be substantially reduced by having several persons, interested or disinterested, participate in preliminary interviews.

P. M. Parry, vice-president and commercial manager, attended the sessions. He emphasized that sales efforts be directed toward appliances that make a profitable load. Among subjects of reports were: dealer contacts, attractive campaign report forms, resale stock, government and municipal sales, keeping customers sold, advertising and competitive power.

Records of the sales groups in per cent of quota were: industrial 153.4, government and municipal 173.6, commercial 98, residential 96.3.

●

Air Conditioning Standards Being Developed

Proposed California "Standards of Air Conditioning for Human Comfort," in a tentative form were first submitted to the Air Conditioning Society of San Francisco by its special standardization committee at the June 24 meeting. Neil H. Peterson, reelected president of the Society, told of the complexity of compiling and reconciling the various viewpoints and special conditions necessary to such proposed standards.

The committee headed by T. A. Hardy as chairman, with two subcommittees, one on summer air conditioning headed by H. L. Lincoln, and one on winter air conditioning headed by Dr. B. M. Woods, worked over the guide of the American Society of Heating and Ventilating Engineers, the Refrigeration Data Book of the American Society of Refrigerating Engineers, the Interim Code of the Air Conditioning Manufacturers Assn., the Code for Warm Air Heating, and the Chicago Standards for Comfort Air Conditioning, bringing into the standards particular conditions existing in California. A draft of the proposed standards was given to every member with a request that comments or suggested changes resulting from study should be turned over to the committee for final revision.

Mr. Peterson also announced the chairmen of various standing committees of the San Francisco Society; R. A. Folsom, of W. R. Ames Co., is chairman of the program committee, C. L. Peterson, of Minneapolis Honeywell Co., is chairman of membership and attendance, H. L. Lincoln, Union Ice Co., is chairman of legislative committee, Tom Hunter, of Hunter & Hudson, chairman of the cooling tower test committee, keeping liaison with the engineering department of the University of California, and C. P. Hardy and the entire personnel of both summer and winter cycle groups of the standardization committee.

J. A. Hill, secretary, reported on the organization of a Sacramento Air Conditioning Society. Tom Hately of Hately & Hatley, contractors, was selected president and J. H. Schacht, Pacific Gas and Electric Co., secretary. An initial membership of 17 started the Society on its way.

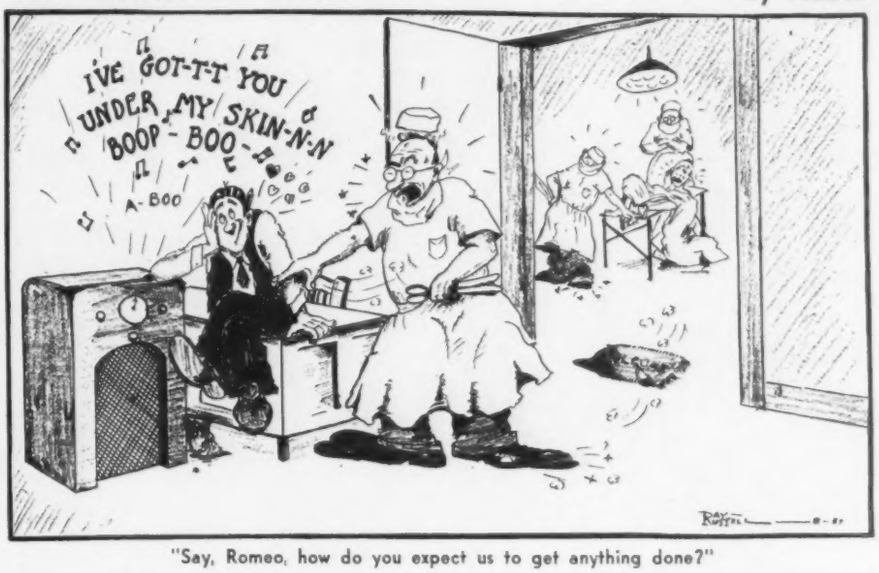
Women Tell Why They Like Ranges

As an aid to dealers and their salesmen as well as a guide for themselves, home economists of the Los Angeles Bureau of Power & Light, on each call to a new range user, find out why that customer purchased an electric range. Answers are tabulated and furnished to the trade periodically.

Cleanliness tops all other buying motives according to the Bureau's record. Here are the reasons for purchasing given to the home economist by housewives during one recent month: cleanliness 188; better food 125; modernity 94; safety 92; automatic 87; husband requested 75; appearance 58; coolness 55; health 51; economy 30; previous owner 29; and friend recommended 18. During warm summer months coolness is a feature that moves near the top.

Significant is the fact that during all the time these records have been kept, cleanliness has been considered the most important feature to the women who used the ranges. It suggests giving stronger emphasis to heat without combustion, complete elimination of smoke and soot through use of the electric range, the fact that bottoms of pots and pans are always clean and that drapes, walls and ceilings stay clean in the electric kitchen.

TOO ARTIFICIAL FEVER —by Russell



"Say, Romeo, how do you expect us to get anything done?"

APPLIANCE SALES REPORT

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Department of Utilities

June, 1937	L. A. Bureau of P. & Lt.[1]		Idaho Power Co.[2]		P. G. & E. Co.[3]		San Diego Cons. G. & E Corp.[4]		San Joaquin Lt. & P. Corp.[5]		Southern Calif. Edison Co. Ltd.[6]		Utah Power & Lt. Co.[7]		Wash. Water Power Co.[8]	
	Current	6 Mos.	Current	6 Mos.	††Current	††5 Mos.	Current	6 Mos.	††Current	6 Mos.	Current	6 Mos.	Current	6 Mos.	Current	6 Mos.
Ranges	606	3,124	407	2,761	386	1,515	60	380			614	3,579	488	2,920	225	1,115
Water Heaters	157	823	277	1,301	238	987	55	298			208	1,472	327	1,163	282	823
Air Heaters, aux.	13	862	3	352	127	5,905	50	1,025			31	1,894	19	911	6	659
Air Heaters, 220	12	181			53	463										
Refrigerators	5,284	20,415	934	3,618	5,914	16,149	1,050	4,175			6,230	27,080	1,653	6,179	1,248	4,769
Dishwashers	13	48	5	10	19	63							1	33		5
Washers	2,100	9,793	287	1,995	2,836	12,795	400	2,050			2,614	16,163	1,003	5,673	461	2,833
Ironers	351	1,561	29	235	626	3,090	75	430			398	2,564	59	321	39	248
Vacuum Cleaners	565	3,359	82	604	2,631	12,541	235	1,345			950	6,930	512	3,641	232	1,494
Radios	2,402	12,801	306	3,280	9,261	50,113	850	5,775			3,805	26,114	844	7,037	769	5,655
Mixers	194	998	49	398	452	3,970	125	725			446	2,326	152	1,397	165	854
Cookers, Casseroles	57	318	25	214			100	410			100	537	137	547	482	1,709
Irons	625	3,006	367	2,176			600	3,025			1,450	8,460	1,328	7,644	732	4,575
Waffle Irons	127	752	58	718			175	1,125			430	2,681	332	2,611	167	959
Toasters			78	953			325	1,975			610	3,722	609	3,996	433	2,246
Table Stoves	115	786	175	756			75	400			277	1,679	938	5,746	261	1,219
Heating Pads	29	533	6	356			85	1,045			85	1,759	65	1,734	93	758
Curling Irons											38	350	111	2,307		
Coffee Makers	102	573	110	954			375	1,850			305	2,022	465	3,711	409	2,129
Sewing Machines			3	89	3,148	6,016	100	610					97	877	65	294
Clocks	198	1,034	24	298							545	3,153	405	2,827	166	1,501
Fans	357	560	220	357							1,146	1,663	651	849	514	749
Floor Polishers																
Sun Lamps	19	204	1	48							17	285	2	81	2	13
Reflector Lamps			64	1,235									620	5,597	263	5,794
Miscellaneous Lamps			188	2,162									653	5,620	795	4,299
Yard Lights																
Misc. Small Appl.	248	1,425					600	2,850			787	4,257			7,972	45,609

APPLIANCE

Sources:

[1] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.
[2] Figures compiled by Electric Equipment Sales Association. Include power company sales and sales of all reporting dealers—about 60%.
[3] P. G. & E. reports sales of major appliances only based on accurate reports available from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers.
[4] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Clocks, fans, included under miscellaneous.
[5] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.
[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.
[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.
[8] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.
† Under current month heading is shown previous month's figure. Lag of one month is also shown in total sales for year to date, which began December, 1936.
‡ June report was not available at time of going to press.

Electric Soil Sterilizer Kills Pests

Electric soil sterilization for hotbeds, flats and benches in greenhouses has been demonstrated to be entirely practical as the result of experiments conducted at the Entomological Laboratory of the U. S. Department of Agriculture at Sumner, Wash., in cooperation with engineers of the Puget Sound Power & Light Co.

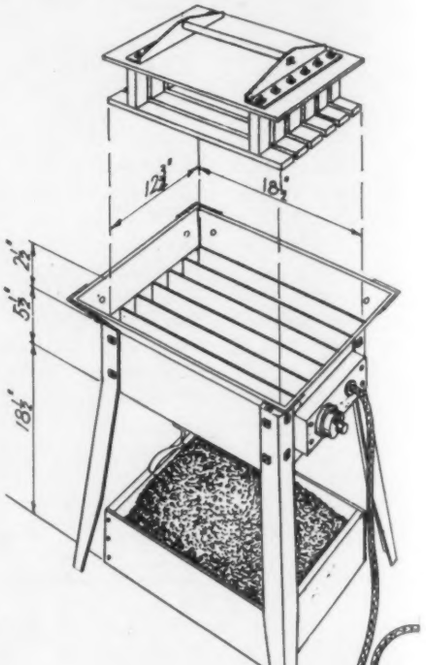
As greenhouse operators know, the damage done to plants in greenhouses on account of disease and pests harbored in the soil is incalculable in dollars and cents. The soil presents a barrier against fumigation and chemical disinfectants, and experience has shown that heat is the only practical method for destroying bacteria and other pests which attack young plants. In experiments with electric sterilizers excellent results have been secured with a current consumption of 350 kw.-hr. per 1,000 sq. ft. of soil five inches deep where a sterilizing temperature of 180 deg. F. was employed.

Authorities are agreed that a 180-deg. temperature is sufficient to kill bacteria and disease organisms and at the same time not injure the soil for the immediate growing of plants. Tests have shown that the following temperatures are destructive to different pests:

Pest	Controlling Temperature (Exposure of few minutes)
Nematodes	140 deg. F.
Systoria lycopersici (spores on tomatoes)	127 deg. F.
Pythium	140 deg. F.
Rhizoctonia (on lettuce)	176 deg. F.
Selerotonia (on lettuce)	176 deg. F.

In the method employed at the Sumner laboratory the soil was heated by forcing electric current through it, the resistance of the moist soil or sand forming the heat. Electrodes were so placed that an equal amount of current could pass through all parts of the earth to be sterilized. With an even moisture content, an even temperature was obtained. This is extremely difficult with any other method of sterilization.

Design of the sterilizer developed is shown in the accompanying illustration. This box sterilizer when loaded with damp dirt raised the soil from a temperature of 83 deg. to 211 deg. in seven minutes with a maximum load of 7.8 kw. Load is dependent upon the moisture content of the soil, the wetter the soil, the heavier the load. In the equipment used it was found that a 4½-min. current exposure was sufficient to do a good job of sterilizing.



Box type electric sterilizer with operating instructions

1. Soil is dumped into hopper between the blades to top level of plates only.
2. Soil is watered to about planting moisture 24 hours before it is to be sterilized.
3. With correct moisture content temperature will rise from 60 to 180 deg. in 4½ min. Too much moisture will hasten temperature rise, but will overload equipment.
4. Bottom of sterilizer is hinged for dropping soil into flat below.
5. Device immediately above hopper is for expelling dirt after sterilizing has been completed.
6. Plates are of any metallic material, spaced 2 in. apart and connected alternately to each leg of 220-volt current supply.
7. Cable must not be smaller than No. 10 and double pole switch rated at 30 amp.
8. It is preferable that top be provided with a cover incorporating a safety switch feature.

Running Water Demonstration Attracts Farmers

Part of the annual running water campaign staged cooperatively by dealers and the Puget Sound Power & Light Co. is the field demonstration of equipment. These running water demonstrations are held in all rural districts of the utility's territory and attract hundreds of farmers. This one is at the Pacific Dairy Farm near Mt. Vernon, Wash., and was arranged by G. H. Bliesner, farm electrification representative. On display were 204 farm water systems, 10 irrigation pumps and two sprinkler irrigation lines

P.P.&L. Connects 10,000th Farm

Pacific Power & Light Co. recently connected to a new rural extension near Walla Walla, Wash., its 10,000th farm customer, a 160-acre wheat ranch. One-fifth of all the company's residential customers now are farms dotted around Astoria, Hood River, The Dalles, Bend and Pendleton, Ore., and Yakima, Toppenish, Sunnyside, Pasco, Kennewick, Walla Walla and Dayton, Wash.

Farm customer No. 1 was connected near Hood River, Ore., in July 1906. This farm, an apple ranch then owned by J. M. Hamblett, is still on the lines.

being now occupied by C. E. Glaze. It would make a strong entry in a contest to discover the first farm in the United States to be connected to a rural power line constructed solely for farm electrification.

The 10,000th farm customer is John G. McGuire, who has lived on the place since it was bought by his father in 1862 for 1,500 bushels of wheat. The family came to Walla Walla by wagon train in that year. The original log cabin on the place is still preserved within the walls of the right wing of the present house. Mr. and Mrs. McGuire use an electric range, water heater, domestic water system and refrigerator, the latter being the gift of the company in recognition of its 10,000th farm customer.

The company's rural extension program has been fairly consistent during the past 31 years. The 1937 quota of new farm customers has already been exceeded, and during the peak of the spraying and irrigation season the company will be serving 10,600 farms.

Residence of farm customer No. 1 (left) connected to the lines of the Pacific Power & Light Co. in July, 1906. Standing in front of the house is Alva L. Day, rural service salesman who built the extension and wired the house 31 years ago. Farm customer No. 10,000 (right), the 160-acre wheat ranch of John J. McGuire was recently connected near Walla Walla, Wash.

B.C. Co. Stresses Rural Potentialities

That application of electricity to agriculture, and the potentialities of farm electrification are important load-building activities of the British Columbia Electric Railway Co. was emphasized last month by F. J. Bowman, rural representative. He spoke in Harrison Hot Springs, B. C., at the Western Sectional meeting of the Canadian Electrical Association.

As an example, Mr. Bowman pointed to the lower valley of the Fraser River, where demand for electricity is growing through intensive, specialized raising of both crops and live stock. Products include vegetables, hops, field crops, milk, eggs, meats, small fruits, greenhouse crops and flowers. Mr. Bowman outlined some of the problems in a region of such diversity.

The job of farm electrification, he said, is to show customers how to apply electricity in their business. This consists of illustrating, demonstrating, and advertising the uses to which electricity can advantageously be put.

He used a typical poultryman, living on a 5-acre farm maintaining a plot of 1,000 laying birds, as an example of the market potentialities. Such a customer would require $35 worth of energy for light, $10 worth for grinding and mixing feed, $25 worth for brooding, $15 worth for pumping, and $8 worth for incubation, a total of $93.

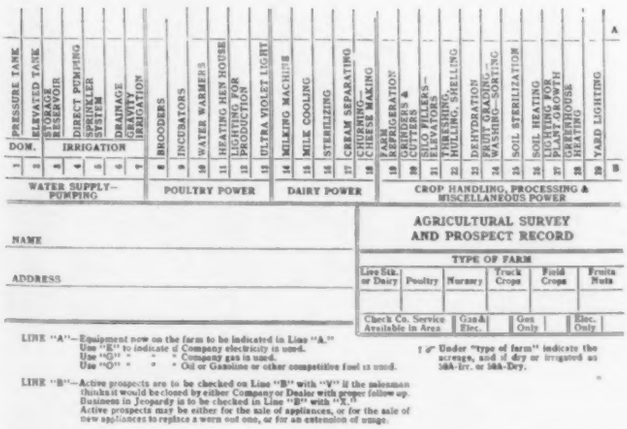
He cited winning dealer cooperation as an essential to successful rural load building. The problem of keeping abreast of new developments and equipment he said had been partially solved by maintaining close contact with established companies, and passing this information along to both dealers and customers.

For contact, B .C. Electric hires salesmen who have a fundamental knowledge of farm practice and can talk the farmers language. They attend his farm meetings and take part in rural community activities. In making calls, these purposes are kept in mind; (1) to procure complete data on connected load, (2) to procure data for prospective load, (3) to ascertain the size, type, and prosperity of the farms, (4) to map in detail secondary distribution, and make a check on service correction.

Assembling such information constitutes a survey which is expected to yield a complete record of each customer's load and of the company's capacity to serve him.

The company believes in building load and good will simultaneously, to which end it tries to assist the farmer in adopting more scientific farm practice, and cooperates closely with government and university agencies. Educational radio broadcasts sponsored by the company are now in their fifth season and this year a series of sound pictures have been made available throughout the territory.

P. G. & E. Surveys Farm Market for Dealers


PRESSURE TANK
ELEVATED TANK
STORAGE RESERVOIR
DIRECT PUMPING
SPRINKLER SYSTEM
DRAINAGE
GRAVITY IRRIGATION
DOM.
IRRIGATION
BROODERS
INCUBATORS
WATER WARMERS
HEATING HEN HOUSE
LIGHTING FOR PRODUCTION
ULTRA VIOLET LIGHT
MILKING MACHINE
MILK COOLING
STERILIZING
CREAM SEPARATING
CHURNING
BUTTER MAKING
FARM REFRIGERATION
GRINDERS & MIXERS
SILO FILLERS
ELEVATORS
THRESHING
HULLING, SHELLING
DEHYDRATION
FRUIT GRADING
WASHING—SORTING
SOIL STERILIZATION
SOIL HEATING
LIGHTING FOR PLANT GROWTH
GREEN HOUSE HEATING
YARD LIGHTING
WATER SUPPLY—PUMPING
POULTRY POWER
DAIRY POWER
CROP HANDLING, PROCESSING & MISCELLANEOUS POWER
NAME
ADDRESS
AGRICULTURAL SURVEY AND PROSPECT RECORD
TYPE OF FARM
Live Stk. or Dairy
Poultry
Nursery
Truck Crops
Field Crops
Fruits Nuts
Check Co. Service Available in Area
Gas & Elec.
Gas Only
Elec. Only
LINE "A"—Equipment now on the farm to be indicated in Line "A."
Use "E" to indicate if Company electricity is used.
Use "G" " " " Company gas is used.
Use "O" " " " Oil or Gasoline or other competitive fuel is used.
LINE "B"—Active prospects are to be checked on Line "B" with "V" if the salesman thinks it would be closed by either Company or Dealer with proper follow up.
Business in Jeopardy is to be checked in Line "B" with "X."
Active prospects may be either for the sale of appliances, or for the sale of new appliances to replace a worn out one, or for an extension of usage.
† Under "type of farm" indicate the acreage, and if dry or irrigated as 50A-Irr. or 50A-Dry.

Pacific Gas & Electric Co. rural electrification specialists are completing a system-wide survey of electrified farms designed to furnish up-to-date information on present installations together with a prospect list for additional applications. Results when finally compiled will be used as the basis for campaigns to assist dealers in selling equipment not now installed. At the same time these men are surveying the

★ Check on other side the type of Equipment carried. Also indicate the makes. And the name and location of the Mfg. or Wholesaler they buy from.

establishments of dealers who handle farm electric equipment so that complete data on type of store, equipment sold, and other pertinent material will always be available at division offices. At the left is the type of prospect card being used for farm customers. The reverse side incorporates a public relations audit. At the right is the dealer survey card

Apprenticeship Program Launched by E. M. E. A.

A PROGRAM of training designed to (1) furnish industry with skilled workmen, and (2) prepare young men to become economic assets to the community by providing a definite objective for them in industry with a steady job at fair wages, has been started by the Electrical Maintenance Engineers Assn. of Southern California. Asking for comments upon its program (send to E.M.E.A., 514 Chamber of Commerce Bldg., Los Angeles), the committee has been selected and signing of apprentices will begin immediately.

Approximately 11,000 electrical maintenance men are employed in Southern California, and since there is no organized training program to prepare electricians for maintenance jobs it is felt that this training program will enable young learners to acquire abilities which will fit them to enter industry and become skilled craftsmen.

Committee members selected are: E. E. Lombard, Bethlehem Steel Co., H. S. Warren, Firestone Tire & Rubber Co., and Emerson Reichard, General Petroleum Corp. The members selected by the manufacturers' group are: K. E. Herrick, Gay Engineering Corp., E. M. Ellis, General Electric Co., and H. D. Easterbrook, Westinghouse Electric & Mfg. Co. The Los Angeles School Board representative is: L. G. Stier, vice-president of Frank Wiggins Trade School. Mr. Easterbrook has been elected chairman of the Apprenticeship Committee. Walter E. Coburn, president of the Electrical Maintenance Engineers Assn., who wrote the plan for the apprenticeship training program is an ex-officio member of the above committee.

The program is as follows:

A Plan for Training Apprentices in the Electrical Maintenance Trade

The adoption of standards for the operation and control of apprentices in the maintenance electrical trade for the city and county of Los Angeles is vested in an advisory committee on apprenticeship. The standards shall cover the needs of maintenance electrical apprentices and their instruction in all branches of the industry, hereafter referred to as the "Electrical Maintenance Trade."

The advisory committee on apprenticeship for the electrical maintenance trade, hereinafter referred to as the apprentice committee, shall be understood to mean a committee of seven (7) members, three (3) of whom shall be employers and members of the manufacturers and industries committee, three (3) of whom shall be members of the Electrical Maintenance Engineers Assn., an employee group, and one (1) member selected by the Los Angeles Board of Education. It shall submit its apprentice training and any revisions made to the California State Apprentice Committee for approval; it shall make monthly reports to the State Committee showing the number of apprentices indentured, number discontinued, and causes for such discontinuance.

Urgent need for skilled electricians is beginning to be felt after years of depression forced neglect of apprenticeship training. This program represents seasoned experience and careful thought and may well serve as a model for similar programs in other Western communities.

Rules and Regulations

I. Apprenticeship defined:

1. An apprentice is a person at least 17 years of age, who has entered into a written agreement with a responsible agency to be employed as a learner, worked as a learner, promoted as a learner, and paid as a learner for a stated number of hours.

II. Ratio of apprentices to journeymen:

1. No employer shall be permitted to employ more than one (1) apprentice to every five (5) journeymen on the job.

III. Apprentice wages:

1. Apprentices shall be employed at the following percentage of the journeyman's wages:

1st year	40 per cent
2nd year	50 per cent
3rd year	60 per cent
4th year	72 per cent

3. After the four-year period of job and school instruction has been satisfactorily completed, the apprentice shall be rated and certified as a full-time journeyman.

4. An examination of apprentices shall be given before each period of advancement and at such times as is determined by the Apprentice Committee. In these examinations consideration shall be given for school attendance and daily employment of the apprentice.

IV. Enrollment of student in apprenticeship:

1. Application may be made with junior placement offices of the United States Employment Service, the placement offices of the L. A. School system, any employer in the manufacturing and mechanical industries in Los Angeles and the Electrical Maintenance Engineering Assn. of Southern California, or any agency approved by the Apprentice committee.

2. Applicants will be examined and their applications approved or rejected upon recommendation of the advisory committee or their representative.

V. Probationary period and advancement:

1. All apprentices employed under this agreement shall be subject to a tryout period of not to exceed (30) days. During this tryout period annulment of the indenture will be made by the committee upon request of either party without the formality of a hearing.

2. Apprentices will be advanced from lower to higher ratings upon completion of the time allotted provided they pass an examination satisfactory to the committee.

VI. Apprentice program:

1. First year—All apprentices with no previous experience or training will attend a trade preparatory school for 800 hr. before being formally indentured to an employer and full credit will be given for ten months training on his first year apprenticeship.

2. Second year — Minimum of 1,800 hr. trade work on the job, 144 hr. instruction in trade school.

3. Third year—Minimum of 1,800 hr. trade work on the job, 144 hr. instruction in trade school.

4. Fourth year — Minimum of 1,800 hr. trade work on the job, 144 hr. instruction in trade school.

5. The school instruction shall be confined to trade technical, related technical, and such instruction in citizenship as may be necessary to prepare the apprentice to become a social and economic asset to the community.

In case of failure on the part of any apprentice to fulfill his obligation in respect to school attendance or deportment, the Committee shall have full authority to suspend or revoke his indenture and the employer hereby agrees to carry out the instructions of the committee in this respect.

VII. Supervision of apprenticeship:

1. The apprentice shall be instructed in school for four hours a week and the work in school and on the job coordinated by such staff as the L. A. Schools may provide for them. The Apprentice Committee will deal with all apprentice problems regarding the learning processes on the job.

2. A complete record of the apprentice's performance, both on the job and in school shall be kept on file so as to be available to the committee at all times.

3. All cases of dissatisfaction shall be referred to the committee for solution.

VIII. Modifications of rules and regulations:

1. These rules may be modified at any time by a majority vote of the committee. Such modifications shall not alter indentures in effect at the time of the change without the consent of both parties to such indentures.

IX. Trade processes to be taught:

1. The parties to this agreement shall be required to provide each apprentice with the opportunity to learn the entire trade before the completion of the apprenticeship period.

These periods and a general program of the processes to be taught during each are to be outlined and may be modified from time to time by the apprentice committee as the necessity arises because of new processes and methods being used in this rapidly expanding trade. A condensed schedule of the work, experience, and school training will be found in the appendix to this agreement.

X. Agreement of apprentices to abide by rules:

1. Every apprentice regularly enrolled under this agreement shall be required to sign his name in the proper place to this agreement as evidence that he has read these rules and regulations and agrees to abide by the same. This signed agreement shall be deposited with the Apprentice Committee, together with one copy of the indenture contract. The indenture contract shall contain a brief summary of the subject matter contained herein and shall be signed in quintuplicate; one copy for each of the following: the apprentice, the employer, the Apprentice Committee, the Los Angeles Board of Education, and the California State Apprentice Committee.

Type and Schedule of Processes to Be Learned

First 10 months in Trade School
(Safety instruction to be continuous)

TRADE TECHNICAL—1 hour per day

1. Wire gauge measurements.
2. Current electricity.
3. Storage batteries.
4. Resistance.
5. Ohm's law.
6. Series and parallel circuits.
7. Properties of matter.
8. Principles of mechanics.
9. Electrical work and power.
10. Feeders, sub-feeders and branch circuits.
11. Magnetism.
12. Electro-magnetism.
13. Electro-magnetic induction.
14. Ammeters and voltmeters.
15. Measurment of resistances.
16. Armatures.
17. Alterating currents.
    (a) Vectors.
    (b) Resistance and inductance.
    (c) Reactance and impedance.
    (d) Power in A. C. circuits.
    (e) Power and power factor problems.
    (f) Trigonometric functions as applied to A. C. solutions.
18. Transformer connections and calculations.
19. Calculate winding for split phase motor (stator).
20. Calculate winding for repulsion motor (stator).
22. Calculate winding for 3-phase motor (wound rotor).
23. Motor controls.
24. Calculate winding for D. C. motor (armature).
25. Calculate winding for D. C. motor (compound fields).
26. Synchronous motor.
27. Synchronous motor controls.
28. Review of polyphase circuits.
29. California electrical safety orders. (Emphasis placed on industrial equipment applications).
30. Trade ethics.

JOBS—3 hours per day

1. Conduit, rigid; cut, thread, ream and bend.
2. Install 2-wire service lighting.
3. Install 3-wire service lighting.
4. Install branch circuits, lighting and appliance.
   (a) Controlled by single pole switches.
   (b) Controlled by 3-way and 4-way switches.
   (c) Controlled by master switch.
5. Install return call annunciator.
6. Install intercommunicating telephones.
7. Wiremold.
   Install 1-lighting circuit complete.
8. Testing circuits for opens, shorts, grounds.
   (a) Signal systems.
   (b) Commercial.
9. Install power services.
   (a) Single phase 220 volt.
   (b) Direct current 250 volt.
   (c) Three phase 220 volt.
10. Install motors and reverse direction of rotation.
    (a) Single phase—split phase type.
    (b) Single phase—repulsion type.
    (c) Three phase—squirrel cage.
    (d) Three phase—wound rotor.
    (e) Direct current—series wound.
    (f) Direct current—shunt wound.
    (g) Direct current—compound wound.
11. Connect and test transformers.
    (a) Delta-Delta.
    (b) Star-Star.
    (c) Star-Delta.
    (d) Delta-Star.
    (e) Open Delta.
12. Wind following motors:
    (a) Split phase, stator.
    (b) Three phase, stator.
    (c) D. C. armature, lap.
    (d) D. C. armature, wave.
    (e) Three phase wound rotor.
13. Drill press
    Drill and tap castings.
    Drill and tap boxes.
15. Engine lathe.
    Turn commutator.
    Make sleeve bearings.
    True up end bell.
15. Electric hand tools.
    Repairs, etc.

JOBS

(2d, 3rd and 4th years)

1. Explosion proof equipment.
2. Dust proof equipment.
3. Electric furnaces.
4. Pyrometers.
5. Hoists.
6. Cranes.
7. Generators, D.C. and A.C.
8. Switchboards and instruments.
9. Battery charging equipment.
10. Electric trucks.
11. Call systems.
12. Lead cables.
13. Oil switches.
14. Circuit breakers.
    a. Oil
    b. Air.
15. Rheostats.
16. Drum controls.
    a. Starting.
    b. Reversing.
    c. Speed control.
17. Face plate controls.
18. Grid resistors.
19. Reactors.
20. Photo electric cells.
    a. Control relays.
    b. Counting relays.
21. Vertical motors.
22. Pumps.
23. Fans.
24. Blowers.
25. Ovens.
26. Lighting.
    a. Plant lighting layouts.
    b. Lighting units.
27. Balancing loads on feeders.
28. Multiple controls.
29. Lubrication.
30. Presses.
31. Shears.
32. Gearing.
33. Speed reducers.
34. Shafting.
35. Belting.
36. Clutches.
37. Couplings.
38. Motor-generators.
39. Converters.
40. Rectifiers.
41. Turbines.
42. Relays.
    a. Open phase.
    b. Phase reversal.
    c. Temperature.
    d. Current.
43. Switches.
    a. Pressure.
    b. Vacuum.
    c. Float switches.
    d. Limit.
    e. Master.
44. Brakes.
    a. Magnetic.
45. Estimating.
    a. Material costs.
    b. Labor costs.
46. Stock room accounting.
47. Power layouts.
48. Welding.

144 hours per year in school for the 2nd, 3rd and 4th year will be used for discussing trade technical matters pertaining to such equipment as listed above.

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THREE HUNDRED electrical maintenance men attended the first annual stag of the Electrical Maintenance Engineers Assn. of Southern California, held in June. Profit sufficient to enable the association to purchase lapel attendance buttons for all members, associates and guests was obtained from the affair. The July 20 meeting of the E.M.E.A. at Rosslyn Hotel was scheduled to discuss "Lap and Wave Wound Direct Current Generators" and "Types and Application of Direct Current Control." No meeting is scheduled to be held in August.

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Questions—of last Month Answered

1. The following instruments should be sufficient for good plant maintenance:

1—d.c. volt meter—3 scale 0-15; 0-150; 0-300 volt.
1—d.c. millivolt meter with shunts of 20, 200, 500 amp.
1—a.c. volt meter 0-300; 0-600 volt.
1—Recording, polyphase, watt meters a.c., d.c., 100-200-500 volt, 5 amp.
2—5 amp. current transformers 10-20-40-100-200-400-800 amp. primary.
2—potential transformers 110 volt secondary, 2,200-volt primary.
1—500-volt megger.
1—a.c. ammeter, 5 and 10 amp. scale.
1—a.c. ammeter, 2½ and 5 amp. scale.

With these instruments an electrician should be able to run any practical test in the average plant.

There has been some discussion about the graphic meter with individual meters in comparison to analizers, all analizers to the writer's knowledge being of the indicating type, which is satisfactory for a steady load; but where the load is variable the graphic chart is a very good record for reference.

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2. The following tools should be sufficient for the electrician as his personal property:

Side cutting pliers
Combination pliers
Long nose and diagonals
Adjustable hack saw
Cold chisels and punches
Set socket wrenches
Tin snips
Files
Taps to ¼ in.
Drills to ½ in.
Pipe wrenches 6 in., 10 in. and 14 in.
Pipe reamer
Brace
Hand drill
Revolution counter
Voltage tester
Set of safety set-screw wrenches
Combination square
6-ft. Zig-Zag wood rules
Gasoline torch
Soldering iron.

This is an inexpensive set of tools and it will enable the mechanic to do the average work. All special tools should be furnished by the employer—also all larger tools. All broken, or worn-out tools should be replaced by the employer, provided the old tools are turned in at the time.

EDITORIAL

The Utilities Need Friends

IF ELECTRICAL WEST had a place for guest editorials, it would turn that page over this month to Lord & Thomas' Don Francisco. In a cryptic and succinct statement of one of the major problems facing American business today, he has pointed his finger at the basic need of the utilities. Let every person in the industry, irrespective of his station, ponder upon the truth of the following quotations from Mr. Francisco's statement taken from a recent issue of "Advertising and Selling":

"Business today needs more friends, as well as more customers. There is deep-rooted resentment against business, authority, power, profits. Never has individual or corporate success been given less applause. The spirit of the times seems to be to tax the thrifty, soak the successful, and eliminate the efficient. There are crusades to redistribute wealth, to break up the concentrations of power, to do a hundred other things. Economic advantage is confused with illegal advantage. Businesses that can sell for less are denounced as unfair . . . . . .

"The truth is that politics and industry are in competition for the public's favor, and industry is suffering because it has not told its story. Business is looked upon as a selfish master—not as a good servant. No amount of lobbying at the state or national capitols will correct this public attitude. As successful manufacturers have won the consumer so that they might thereby win the dealer, so business must now win the voter in order to win the politician.

"Business cannot proceed on the assumption that customers are friends. Motorists may buy at your service station but damn you because they think you are a monopoly. They may go out of their way to save a few pennies at your chain store and then denounce you for paying low wages. Making friends and making customers are two different jobs—separate though related.

"Without friends, without enlightened public opinion based upon self-interest, a business with a million customers can be crucified by a militant minority . . ."

No one can deny that the utilities need friends. Their past is strewn with crosses on which they have been pilloried by militant minorities. And the future promises similar treatment. Despite low rates, despite efficient service the electrical business is still a target for abuse.

Perhaps those who have shouldered most of the burden of these attacks have been too close to the picture. Is it not possible that someone from the outside with a detached viewpoint could analyze the problem and suggest possible answers? At any rate the need is so great that every man and woman in the industry, from sheer self-interest, should interpret his or her job in terms of making friends for his company.

A Word to the Inspectors

WHEN the inspectors meet in Salt Lake City later this month, they can perform a distinct service to the industry by defining the true purpose of the National Electrical Code. It is just about time that the misguided notion that the code represents a standard of adequacy is finally exploded. For years the industry has accepted a *minimum standard of safety* as a desirable standard of completeness. The wiring provisions set down in the code are far from this and the inspectors as the enforcing agency are in a fine position to tell this to the industry. In their capacity of protectors of the public they might well promote the standards set forth in the new Wiring Handbook, for they were a party to its preparation. They can well say to the public "The code is only a standard of safety. The Wiring Handbook is a standard of adequacy which assures you an electrical installation which will give you all of the service, comfort and convenience that electricity can provide."

"Cops and Robbers"

IF originally there may have been something of an idea that you must employ a wireman to catch a wireman in the relationship and the respective places in the electrical industry of contractor and inspector, happily that old game of "cops and robbers" has been outgrown by a more adult industry. There may still be contractors that need policing by inspectors, but these are more the exception than the rule. And today, with a tendency to set up standards of business practice as a prequalification to obtaining a contractor's license, (as told by Roy Butcher in this issue) there will continue to be less need for policing of wiring and more room for cooperation between inspector and contractor to see that the customer gets what he needs.

Both, after, all, exist only to serve the customer. Inspectors came into being as agents of the customer because the latter felt ignorant of electricity and

wanted an experienced representative to see that what he bought was safe. As the contractor becomes a better business man he is less inclined to regard his customer as his prey, snatched away from another lone wolf, and his to devour as he sees fit. Such a business-man-contractor needs less policing, welcomes the cooperation of the inspector whose experience may help him to anticipate some need for his customer which neither the customer nor the contractor have foreseen. It is upon this sort of relationship that adequacy will be sold, and codes will not need to be written to legislate it arbitrarily. Adequacy that is sold with enthusiasm will enlist the customer himself to sell more of it by his own satisfaction expressed in word-of-mouth advertising.

The West this year is fortunate in two major conventions, one of inspectors at Salt Lake City this month, the other of contractors in Los Angeles in October. It is likewise fortunate that in both conventions a constructive, up-building attitude predominates, that there is less of the cop, and less of the robber in both. The public will be happier to regard its inspectors as consulting advisors in electrical comfort and convenience; its contractors as experienced and skillful providers of these benefits of modern invention and science.

"Little Old Lady"

LET George Kelley of Portland tell how the idea of kitchen planning first came to him—and who better should tell it than the head of the present department of Portland General Electric Co. so energetically fostering the spread of electric kitchendom.

". . it brought to mind the interesting fact that kitchen planning was carried to me on my very first sale of an electric range, over 10 years ago. Since then I have sold more than 700 ranges, but I still remember as if it were yesterday selling the first one.

"The customer was a fine old lady who realized late in life that electric cooking would bring her a lot of happiness even if only for the convenience and cleanliness of it. She lived in a pretty little cottage almost at the top of Mt. Tabor with several windows of her home facing one of the prettiest views in the world—from Portland to the snowcapped peak of Mt. Hood.

"Several windows in her home faced this view, but what about her kitchen window? Well, it looked right against the roof of a back porch. When I saw the kitchen I remarked that an electric range could be installed at the most convenient place in the kitchen and need not be where her old fuel range had been, and would allow for a slight rearrangement of her equipment. This would allow a double window in the side of the kitchen facing Mt. Hood.

"When I called back to see how she was getting along with the new electric range, I saw even more than I expected—a beautiful French type of window with leaded glass and an effect so pleasing that it was a source of pride, almost equal to her new range. Right then I realized that a range salesman could furnish one of those little extra helps which every customer appreciates and which could lead to the more complete electric kitchen. Since that time the same customer has bought an electric water heater and every small appliance that we have recommended."

It was by placing the inherent advantage of electricity—its flexibility—at the disposal of the customer whereby she might enjoy other advantages of her home more that made this such a satisfactory transaction. It is "those little extra helps which every customer appreciates".

Low Voltage

AT A bridge party recently two housewives were particularly vehement in their denunciation of electric cookery. Yet both were electric range users. It wasn't the fault of their equipment—one range was less than a year old and the other not yet three. Both were discouraged with their experience. Their principal complaint was lack of speed—the ranges were simply too slow, particularly in the preparation of dinner.

At an inspectors' meeting in that same city the local electrical inspector made a significant statement. He said, "Let's stop talking about wiring adequacy and do something about service adequacy. The distribution facilities in many parts of this community are so overloaded that the voltage at the customer's service will not much more than make a lamp glow. It's like turning on the water faucet and getting a few trickles instead of a full stream."

There is a definite connection between these two experiences. During the depression, residential load continued to grow; it was the backbone of many utilities' business. And at the same time funds were not available for reconditioning, maintaining or strengthening distribution facilities. The result is that in many heavy residential sections, lines and transformers are heavily overloaded.

Where such conditions exist corrective measures are imperative. Under such conditions customer dissatisfaction is certain. Worse still, sales resistances for more extensive use are built up which will be hard to overcome. Take for example the two housewives with their ranges. They can do more harm to electric cookery than a dozen salesmen can do good. Sound operating policy dictates that such poor service conditions be kept at a minimum.

Our Readers Write

PRO

To the Editor:

In going over the May issue of ELECTRICAL WEST I read your article on the bathroom heater. I thoroughly agree with the comments made in this article and would like permission to reprint it in a news letter to be sent to dealers throughout the San Joaquin Valley.

Residence building is progressing at a rapid rate throughout this territory and it really is a pity that bathroom heaters are being installed in so few of the better homes. It is our intention with this news letter to endeavor to stimulate further interest in the matter on the part of contractors and dealers.

E. F. HAUCH
Sierra Wholesale Electric Co.
Fresno, Calif.

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AND CON?

To the Editor:

"Hail the bathroom heater." Wonderful. And from a worried mother's standpoint too. But healthy? Yes, when nothing interferes with the breathing of pure, fresh air.

Have you ever had the bathroom all ready for your bath—warm, etc.—then had someone, especially one of possibly several children, come to you asking admission, a case of nature's urgency, then had to open wide the windows to renew the air of your bathroom and then close them and wait possibly a half-hour to reheat the room?

While you are advocating the bathroom heater why not also advocate the separate toilet room, so there will not have to be that loss of electricity which amounts to so much in a budget for the ordinary wage earner?

Possibly I haven't put it just as someone else could have done, but think it over. Even that side is a drawback to one of those selling points, written up in your magazine which I happened to see in the house of a friend.

MRS. H. E. MITCHELL
Saugus, Calif.

We hasten to point out that ELECTRICAL WEST did advocate, by innuendo, in the September 1936 issue, a separate toilet room. Quoting from page 48:

"Recently advocated is the substitution of the term health room for bathroom with the creation of a room in which standard bathroom functional equipment is placed out of sight, and bathroom space used to create an attractive, restful location for exercise, health measures and relaxation."

Editors.

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MICHIGAN WIRES

To the Editor:

A few days ago I received my copy of the June issue of ELECTRICAL WEST featuring "The Convention in Print". I just want to let you know how much I enjoyed it, and judging from the papers presented, a great deal of interest must have been evinced at this convention just concluded. It was also a particular treat to me to look over the pictures included therein and notice the familiar faces of many of my friends on the Pacific Coast.

I particularly enjoyed the article entitled "Embarrassing Questions That We Want the Public to Ask". This article is very timely, because of the great activity in the home lighting field. We have found in this work that a great deal of sales resistance is presented by both our urban and rural customers because they lack both adequate wiring and sufficient convenience outlets.

You might be interested to know that the wiring committee of the Michigan Electric Light Assn. is an active one and has been thinking along similar lines. As a matter of fact, at our convention next month the wiring committee will present for inspection a model two-story house built to a scale of 2 in. to the foot, costing about $3,000 (funds were provided by utilities and manufacturers) completely furnished, but built mainly to depict proper wiring. The walls are made of glass so that all wiring, outlets, insulation, etc., are visible. It is portable, of course, and will be available after the convention for utilities and dealers for demonstration to their employees or at group meetings of various kinds. It is believed that this is going to create a lot of interest in adequate wiring.

I am looking forward to the opportunity of renewing old friendships at least in 1939 when I hope to visit the World's Fair in San Francisco, if not before, and I do want to tell you that I look forward every month to receiving my copy of ELECTRICAL WEST.

PIERRE VINET, Commercial Manager
Michigan Gas & Electric Co.
Holland, Mich.

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BON VOYAGE

To the Editor:

. . . . By the way, going East on the City of Los Angeles Streamliner I happened to leave my ELECTRICAL WEST, which I had been reading, in the club car, and I honestly believe more people looked it over than any other magazine in the car. I got quite a kick out of watching it go the rounds.

W. P. SWARTZ, Pacific Sales Manager
Standard Electric Ranges, Los Angeles

So de we.—Editors.

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PRICING OUR WARES

To the Editor:

I have just finished looking over the Annual Convention in Print issue of ELECTRICAL WEST and found it extremely interesting. However, I was struck by the fact that only one person discussed rates and rate schedules, as such, in the whole issue. This was Mr. McNaughton, who is not a member of our industry.

Evidently the Railroad Commission is very interested in the simplification and standardization of rate schedules. The Federal Power Commission is likewise interested in this problem. They have started a new rate survey and have published a number of bulletins on this subject. It does seem rather peculiar that the industry as a whole is not showing any particular interest in the problem and certainly all the utilities would gain a lot by exchanging information and ideas on the subject of rates and rate schedules. A few of the problems which it seems to me the Pacific Coast Electrical Association might look into are as follows:

1. Standardization of schedule forms. Certainly something might be done along the line of standardizing many of the Special Conditions (off-peak, maximum demand, etc.) of our power schedules.
2. We might exchange information on the relation between average rate and average domestic consumption.
3. We might also discuss the effect of rate reductions on load growth and the effect of various types of forms for rate schedules.

These are but a few of the problems which offhand occur to me as being well worth the attention of the Pacific Coast Electrical Assn. After all, the manner in which we charge for the product which we sell has just as much of an influence on our sales as our commercial activities and our progress along engineering lines. The best commercial department in the world will work under serious handicap if it has incorrect or obsolete types of schedules to deal with. The introduction of new types of schedules will create new engineering problems. Therefore, I feel that a discussion of rates and rate schedules among the industry will bring out many interesting ideas and generally will be well worth while.

G. C. DELVAILLE, Rate Engineer,
The Nevada-California Electric Corp.

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CLASSIC WANTED

To the Editor:

The editorial on page 46 of ELECTRICAL WEST, July 1937 issue, under the heading: "Don't Shoot the Piano Player", reminded me of an unsatisfied desire to obtain a copy of this "old barroom classic".

I was unable to procure a copy of this "classic" locally—perhaps I did not contact the right people or stores. At any rate, if you have access to a copy, I will gladly reimburse you for any expense incurred. If it is in a book, I would like to receive the book and have a copy of this particular "classic" typed and return the same to you, guaranteeing its return in good condition.

Please do not go to any expense or trouble in endeavoring to satisfy my request—if you do not have the classic available, please just disregard this letter.

L. B. BENSON,
Anaconda Wire & Cable Co.
914 1st Ave. South
Seattle, Washington.

We haven't got it, but we couldn't "disregard" the letter. Possibly a reader can help.—Editors.

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BIG BUSINESS AHEAD

To the Editor:

I have written to Mr. McArthur, complimenting him on his very fine article in the July issue of ELECTRICAL WEST. This is one of the best explanations of how utilities should merchandise that has been printed. I want to compliment you and your staff on presenting it at this time.

The Pacific Power & Light Co. has done a fine job in selling approximately $75 per consumer during 1936, which compared to our puny job of approximately $30 per consumer indicates that the electrical industry in Southern California should wake up.

Based on his chart, indicating that the consumer using 1,400 kw.-hr. per year will have an investment of $900 in wiring and appliances, the industry has a real opportunity in Southern California, where our average consumption at the end of May was 855.7, indicating an investment of approximately $650 in electrical equipment. To bring our average consumption up to the Pacific Company's level of 1,400, would require the sale of $100,000,000 worth of electrical equipment. A figure like this begins to look like "New Deal" figures. Perhaps I had better stop. Nevertheless it was a fine article.

H. C. RICE, Merchandise Manager,
Southern California Edison Co., Ltd.

News of the Industry

LIGHTNING STRIKES 3 TIMES IN BRITISH COLUMBIA

Electrical storms throughout British Columbia last month caused the destruction of one power plant and damage at two other points. Most severe damage was at Ashcroft where the power house of the Ashcroft Power & Water Co. was destroyed by fire which broke out after the plant was struck by lightning. Damage was estimated at $15,000.

Two generators in the B. C. Electric Railway Company's No. 1 plant at Lake Buntzen were burned out by lightning. Load was shifted with but slight interruption to service. In Vancouver, a B. C. Electric transformer on Main St. was struck.

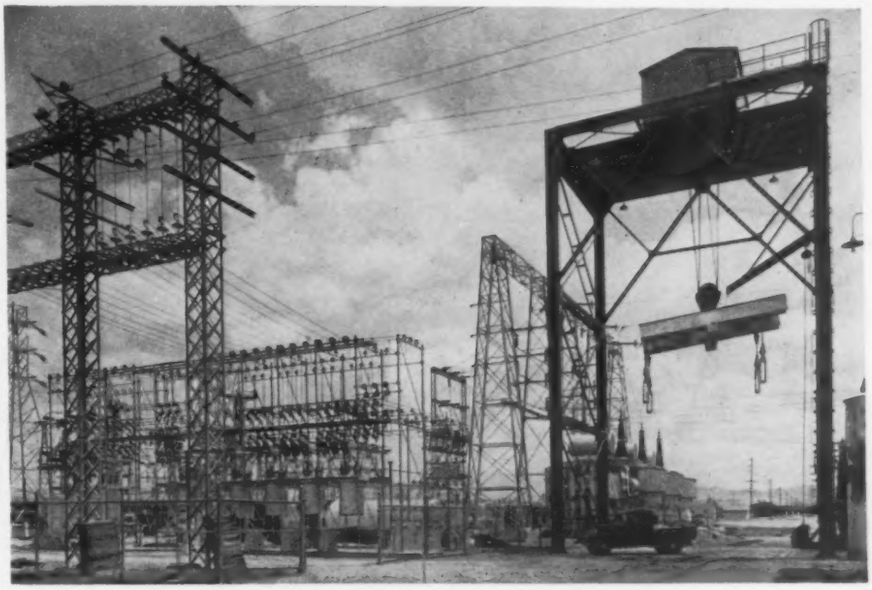
SEATTLE CITY LIGHT URGES TIE TO PUGET SOUND CO.

Permission to draft a contract authorizing construction of an interconnection between Puget Sound Power & Light Co. and Seattle City Light was granted by the Seattle City Council last month to J. D. Ross, superintendent for the city.

"We need the connection so the two systems can exchange power to their mutual advantage," Ross said. "The move is purely economic."

It is understood that City Light proposes a 30,000-kw. tie, to cost $258,000, shared equally by the two concerns. Should the plan be carried out, it might affect rebuilding of Puget Sound's Electron plant, destroyed by an earth slide last November. However, temporary reconstruction of the plant is said to be well under way.

ELECTION TO DISSOLVE The Lassen Municipal Utility District, in Lassen County, Calif., was requested last month in a petition signed by 523 citizens. B. F. Lyle, district president, said directors will meet soon to set the ballot date.



San Joaquin Light & Power Corp., substation at Magunden, on property of Southern California Edison Co., Ltd. Left foreground—San Joaquin structures. At right—Edison transformers stepping down from 220 to 70 kv. for delivery to San Joaquin. Right background—New San Joaquin line from Magunden to Kern Canyon-Weedpatch line

EDISON PLANTS FEED POWER TO SAN JOAQUIN SYSTEM

Power from hydro-electric plants of the Southern California Edison Co., Ltd., is flowing into lines of the San Joaquin Light & Power Corp., following completion of the new tie at Magunden in time for the effective date of the interchange contract, July 1.

Interconnection was accomplished by tying the San Joaquin lines through the Edison Magunden switching station with generating facilities of the Edison Big Creek-San Joaquin River hydro-electric system, and by a tie of San Joaquin lines with the Edison Kern River No. 1 hydro-electric plant. Physical connection through the Edison Vestal switching station has existed for some time.

Involved was construction of 2½ mi. of 70,000-volt line from Magunden east to join the San Joaquin line from Kern Canyon to the Weedpatch substation, the building of a twin-circuit, 70,000-volt line from Magunden north and west to join the Bakersfield-Kern Oil line, construction by San Joaquin of the new substation on Edison property at Magunden and construction by Edison of a short line from its transmission line from Kern No. 1 powerhouse to the San Joaquin Kern Canyon powerhouse.

To facilitate installation, Edison moved a bank of transformers from its Vestal substation to Magunden, and is now preparing to install 60,000 kw. of transformer capacity at Vestal. Edison is delivering power at 60 cycles, stepped down at Magunden from 220,000 to 70,000 volts.

BOARD STARTS HEARINGS AS PG&E WORKERS FORM UNION

Two related events which may have far reaching significance to labor relations of western utilities were developing rapidly at the close of July. First, the California Gas and Electric Employees Union, Inc., was formed by employees of the Pacific Gas & Electric Co.; second, the Regional Labor Relations Board in San Francisco opened hearings July 22, on petition of the C.I.O. United Radio and Electrical Workers for certification as col-

EVENTS AT PRESSTIME

CONTRACT FOR GENERATORS A-6 and A-7, Boulder Dam, was awarded to Westinghouse Electric & Manufacturing Co., on its bid of $1,467,000.

BIDDING JOINTLY, General Construction Co., Seattle, J. F. Shea, Portland, and Columbia Construction Co., Bonneville, submitted the lone proposal: $3,967,785 to construct Ruby Dam. Opposition to possible award was expected.

Special from Electrical West's Washington Bureau.

THE U. S. SENATE UNANIMOUSLY instructed its Commerce Committee to eliminate the Boulder Dam rate revision section from the McNary bill, while the House passed the Bonneville bill, but also struck out Boulder sections.

lective bargaining agent for P. G. and E. employees.

On the outcome of this hearing may depend the application or non-application of the Wagner labor relations act to intrastate utilities. P. G. and E. contends it is not engaged in interstate commerce, that all its business, except small interconnections with the California Oregon Power Co. and the Sierra Pacific Power Co., is within state lines, and that application of the Wagner act to its operations is unconstitutional.

The UREW petition seeks to force an election among employees to determine whether it, the A. F. of L. IBEW or the California Gas and Electric Employees Union would act as collective bargaining agent. C.I.O.'s UREW, although it had nominally invited every class of employee to membership, insists that the election be confined to production and maintenance men. The other two unions insist that all employees be allowed to vote. The new California union has no fear of a company-wide vote. It counts 6,000 members against 5,000 employees divided among C.I.O., A. F. of L. and membership in no group.

New Union

The California Gas and Electric Employees Union, Inc., is a non-profit corporation organized by employees of the Pacific Gas & Electric Co. to represent them in collective bargaining with the management. Students of the labor movement believe that the new organization is notable because: (1) it is incorporated; (2) it offers a method under the Wagner Act whereby employees who have no experience in labor unions and who look askance at the C. I. O. or A. F. of L., can protect themselves from "professional labor organizers"; (3) its plan of organization, by-laws and objectives were set up after thorough study and were designed specifically to meet the needs of utility company employees; (4) it was organized spontaneously by employees without the participation or knowledge of the management.

For Self-Protection

Incorporated May 1, 1937, in the Sacramento Division of the company to serve only that section, it was the idea of five young men who, mulling over provisions of the Wagner Act and viewing with alarm the activities of C. I. O. organizers, decided to act for themselves. The union now claims a membership of 6,000 out of the P. G. & E.'s 11,000 total employees. Membership takes in all classes of employees below the rank of supervisory officials who are defined in the by-laws as those "with the right to hire, fire or discipline." Philosophy back of the organization movement was the realization that whether they liked it or not, chances were they would be organized by someone. Having had no experience with labor unions and feeling that membership in any of the existing national unions might implicate them in situations of which they had no present conception, they decided to organize themselves for their own self protection before any outside "third party" appeared to handle their relationships with management.

With all this in mind, the group made a thorough study of labor organizations, sought the advice of legal counsel, public relations experts and fellow employees and worked out a plan.

Group Incorporates

First, they incorporated, because they believed such action would indicate a sense of the responsibility they felt. Then they drew up a plan of operation and a set of objectives based on the fundamental that their association was formed to promote amicable relations between employees and management with full power to bargain collectively on hours, wages and working conditions. Broad principles were laid down but their application to conditions in the 12 divisions of the company was left to the locals. It was provided in the by-laws that the unions could not affiliate with any other labor organization without a favorable vote of 75 per cent of the total membership. A similar proviso governed a strike vote.

Machinery Set Up

A system of handling grievances was established which has thus far worked effectively. There is a member of a local grievance committee for each group of approximately 30 employees. Assessments are limited to a maximum of $5 per year and the initial dues are 25c per month. There are now 14 locals, one in each of the 12 divisions, one covering the mobile construction forces and another for the Kettleman Hills natural gas production employees. Headquarters of the union are in Sacramento.

That the idea is spreading may be gathered from the fact that employees of the San Joaquin Light & Power Corp. have organized the Western Utility Workers Union with a similar setup and with similar by-laws and objectives.

●

MERGER of the Chelan Electric Co. with the Washington Water Power Co. was approved last month by the Federal Power Commission. The Chelan company, operator of the hydro-electric plants at Chelan, Wash., and Grangeville and Lewiston, Idaho, is controlled by the Washington company, which owns most of the stock.

General Electric Reserves Space at World Fair

Contract for one of the largest exhibit spaces so far reserved at the 1939 Golden Gate International Exposition was signed last month by General Electric Co. for presentation of its "House of Magic." In charge of exposition participation for G. E. is A. V. Thompson.

Signed by J. A. Cranston, commercial vice-president of G. E., in the presence of R. M. Alvord, Pacific district manager, the contract increases the company's previously subscribed $75,000 to an outlay of $333,000. The exhibit will be placed in the 200x447-ft. palace of the electrical industry, of which A. H. Halloran is in charge.

Holding the big lamp are (left) J. A. Cranston, commercial vice-president of General Electric Co., and A. Emory Wishon, president of San Joaquin Light & Power Corp. The bulb was brought forth to symbolize G. E.'s faith in the success of the Golden Gate International Exposition, when the company contracted for exhibit space

●

Hearings Scheduled on Northwestern Co. Franchises

On Aug. 19 the Portland city council will consider franchise renewals for the Northwestern Electric Co., together with extension of the city's option to buy the company's properties. Both franchises and option expire Nov. 13.

Public ownership advocates aired their views at a preliminary hearing Nov. 15, but no substantial public demand for municipal ownership was claimed. City commissioners said their purpose in extending options would be simply to protect the city's future interests.

City and company appear to be in substantial agreement as to terms of the extension. It is proposed that this be long enough to cover establishment of a federal power policy at Bonneville. The company asked that the frequency of submitting the question to the electorate be limited, since too frequent elections hamper financing of essential improvements.

STICKING RINGS TOOK HIM FOR A RIDE

Read what happened when Shell men stepped in and tackled the problem . . . !

THE superintendent of the Diesel light plant in an Iowa town was fed up! Ring sticking caused by excessive carbon and other deposits was increasing maintenance costs —working his staff overtime!*

The Diesel was taken down —pistons pulled and rings examined. A complete survey of the lubrication system and lubricant was made—nothing was overlooked!

Then—and *only* then—did the Shell men make their recommendation! Shell Talpa Oils for Diesel lubrication—perfected by Shell, working with leading Diesel manufacturers!

Today the plant's records show the result: Production of kw.-hours steadily mounting. Consumption of lube oil markedly cut. And, according to the superintendent: "Our carbon and ring troubles are licked!"

Wherever there is a lubrication problem, the ingenuity and resourcefulness of Shell—backed by a progressive engineering staff—are available for your use. Phone or write your nearest Shell office.

*An actual case history from Shell's files

SHELL'S "INVISIBLE ELEMENT" is a combination of Shell's unmatched world-wide resources; Shell's modern laboratories and refineries; years of cumulative experience in research by Shell's engineers and scientists. It is the determination to make lubrication more efficient, more economical for you.

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Reliable

SERJDETOUR
TELEPHONE
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Permits use of telephone circuits immediately after heavy surges on closely paralleling transmission lines.

The Serjdetour is a simple device with no moving parts, no auxiliary relays. It will carry a discharge of twenty-five amperes for ten minutes without becoming short circuited. As it may be used with twenty-five ampere fuses, it practically always handles inductive disturbances without fuses blowing—leaving telephone line clear as soon as power line switches have opened.

It will stand contacts with 66KV or more without blowing up and without allowing any high voltage to get past it.

Write for Bulletin

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3143 CARROLL AVENUE · CHICAGO, ILLINOIS

Where Copper Carrying Capacity Begins

Inspectors will literally approach their problems from the ground up when they convene in Salt Lake City this month. They will visit this electrically-operated, open-cut mine of the Utah Copper Co., and hear R. J. Corfield, mine superintendent describe electricity's applications to copper mining

Guidance Committees Launch P.C.E.A. Program

To spread the benefits of the Pacific Coast Electrical Assn. over a wider territory and to more people is to be one of the aims of the new administration as determined at the first meeting of the directors under the leadership of R. M. Alvord, newly elected president. Committee appointments approved establish a widespread geographic representation so as to permit the holding of organized regional meetings. In addition, plans were approved for launching the work for the new year far earlier than in the past. Besides the fall conclaves and the summer convention, plans were adopted for a spring conclave at Fresno. Moreover, a number of regional meetings will be held at such places as San Diego, Riverside, Phoenix, Reno, Sacramento, San Jose.

Guidance committees were appointed for both the Business Development and the Operating Economics Sections. Personnel of the Administrative Services Section will be announced later. A new project was launched under the guidance of a Sales Management Committee, headed by George C. Tenney, purpose of which will be to study problems dealing with sales management and sales policy, particularly as regards salesman's compensation. Membership activity will be under the direction of W. W. Glosser, vice-president of Hubbard & Co., with H. H. Fogwell, Thermador Electrical Manufacturing Co., and W. P. L'Hommedieu, Westinghouse Electric & Manufacturing Co., as vice-chairmen.

Carl Heise of Westinghouse will head up the Pacific Coast Electrical Bureau Committee which has the responsibility of promoting the code and ordinance work and Red Seal activities. A special committee will be appointed to study revision of the Red Seal specifications to coordinate these with the individual wiring promotion activities of the various utilities.

Tentative dates for fall conclaves are Sept. 23-24 and Sept. 30-Oct. 1, with assignment of dates to Los Angeles and San Francisco to be determined later. The Fresno conclave will be held in March and the annual convention in late May or early June.

Personnel of the guidance committees follows:

Business Development Section: H. C. Rice, Southern California Edison Co., chairman; H. W. Edmund, Coast Counties Gas & Electric Co., vice-chairman; Frank Angle, Allis-Chalmers Manufacturing Co.; H. M. Crawford, Pacific Gas and Electric Co.; Charles Goodwin, General Electric Supply Corp.; E. G. Stahl, San Joaquin Light & Power Corp.; Dudley Wheelock, Nevada-California Electric Corp.; P. P. Pine, San Diego Consolidated Gas & Electric Co.; W. H. Grove, Central Arizona Light & Power Corp.; Frank J. Airey, Frank J. Airey, Inc.; A. E. Hitchner, Westinghouse Electric & Manufacturing Co.

Operating Economics Section: D. D. Smalley, San Joaquin Light & Power Corp., chairman; J. E. Crilly, General Cable Corp., vice-chairman; A. M. Bohnert, Ohio Brass Co.; E. M. Wright, Pacific Gas and Electric Co.; Walter Smith, General Electric Co.; Charles Grunsky, Coast Counties Gas & Electric Co.; A. F. Ayers, Nevada-California Electric Corp.; K. B. Ayres, San Diego Consolidated Gas & Electric Co.; L. K. Doutrick, Central Arizona Light & Power Corp., J. F. Davenport, Southern California Edison Co.; R. A. Hopkins, Westinghouse Electric & Manufacturing Co.

Rocky Mountain League Plans Big Promotion

Thirteen chapters, 500 members, answered last month's roll call of the fast growing Rocky Mountain Electrical League. Vigorous activity on the part of individual chapters and laying the groundwork for a $50,000 sales promotion activity on behalf of all utilities, dealers, distributors and other electrical interests were milestones of the month.

Although $50,000 was named by Chairman Gaylord B. Buck of the League Sales and Promotion Section to indicate the extent of the sales drive, $100,000 is expected to be a closer figure, several dealers and distributors already having pledged additional support. Counting utilities, distributors, manufacturers, retailers and electrical contractors, 10,000 persons are expected to participate. Opening gun will be primed, loaded and ready to fire at the League's Estes Park convention, Sept. 13-15, when details of the 60-day radio, newspaper and direct-mail campaign, reaching 200,000 persons, will be complete.

While early plans for this big promotion were under way, other League-sponsored agencies for pushing the industry ahead were already at work. Available to all local Leagues were the services of Lester B. Johnson, of the General Electric Co. construction material division, who would explain and illustrate how poor wiring is stifling the appliance trade as well as hampering contractors and utilities. Several sound films were made available on various phases of kitchen modernizing.

Meanwhile *McCall's* magazine distinguished the League's contributions to electrical development, and Manager George E. Lewis tried to keep abreast of nationwide inquiries for details of the work and at the same time enlist fresh support throughout the territory.

In addition to chapters at Albuquerque, Carlsbad, Pueblo, Roswell and Santa Fe,* are the following:

Casper—Ed. E. Saricks, president; Don Germond, secretary.
Grand Junction—T. J. Treece, president; Clinton A. Biggs, secretary.
Laramie—Fred Schrader, president; W. C. McCann, secretary.
Las Vegas—Frank Vaughn, president; E. L. Kaemper, secretary.
Rapid City—Fred Dusek, president; H. O. Hudson, secretary.
Rawlins—Bernard H. Berger, president; C. E. Winston, secretary.
Sheridan—Jim McCoy, Jr., president; Homer Gebo, secretary.

●

FRANCHISE for 11 miles transmission and distribution lines in outlying communities of Cowlitz County has been granted to the Puget Sound Power & Light Co. Manager B. M. Atkins announced construction will start soon.

* Electrical West, June, 1937, page 162.

Plan to attend the

ELECTRICAL **EXPOSITION** EXTRAORDINARY!

and the 35TH ANNUAL CONVENTION of the

NATIONAL ELECTRICAL CONTRACTORS

October 18, 19, 20, 21, 1937

LIGHTS! ACTION! CONVENTION! . . . . IN the largest, finest hotel in the West! For four days the Biltmore becomes the "House of Electricity", housing conventionites of the National Electrical Contractors Association from all over the country. Plans are already made for a record-breaking attendance!

As an added feature of the 1937 Convention, there will be an **Electrical Exposition Extraordinary**—staged under the auspices of the Los Angeles Electrical Contractors' Ass'n., right in the Biltmore along with all the other convention activities. Plan to attend, plan to exhibit.

●

MAKE *YOUR* RESERVATIONS NOW

If you haven't already reserved your exhibit space, do so at once. This is a grand opportunity to display your products to every branch of the Electrical industry.

Meet the Who's Who of the Electrical World . . . see What's What in the big Electrical Exposition . . . and stay in the center of everything at America's favorite convention hotel.

Special Convention Room Rates
$4.00 single—$7.00 double
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Write or wire for exhibit rates or reservations promptly

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LOS ANGELES, CALIFORNIA

A GRIP FOR ALL NEEDS

No. 1628-5 B. "Chicago" Grip. Maximum opening .563. Minimum opening .115. Safe Load, 8,000 lbs.

Here's the new "Chicago" Grip capable of handling messenger or guy strand from 3/16 in. diameter up to 1/2 in. diameter. A genuine all purpose grip that can also be used satisfactorily on bare conductors, solid or stranded, from No. 6 to No. 4/0 seven strand copper and A.C.-S.R. up to No. 3/0. A grip that even satisfactorily handles the new three-strand "copperweld" conductor. The bronze-lined jaws prevent slippage. This new grip will afford a sure hold under all conditions, with loads up to 8,000 lbs.

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

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The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Safety for the Pole Climber.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ The Safety Factor on Linemen's Leather Goods.
- ☐ Pocket Tool Guide.

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Program of the A. I. E. E. Convention at Spokane

Last of this month, members of the American Institute of Electrical Engineers will convene at Hotel Davenport, Spokane, Wash., for their four-day Pacific Coast convention. The program:

Tuesday, Aug. 31

10:00 A.M.—OPENING OF CONVENTION
10:15 A.M.—SELECTED SUBJECTS

Address: "Lighting the San Francisco-Oakland Bay Bridge," C. R. Davis, Dept. of Public Service, State of California.

"Present Day and Probable Future Electrical Applications in Aircraft," W. V. Boughton, Douglas Aircraft Co., Inc.

"Proposals for the Administration of Federal Power in the Pacific Northwest," H. V. Carpenter, State College of Washington.

2.00 P.M.—DEVELOPMENT OF PROTECTIVE EQUIPMENT

"Relay Operation during System Oscillations," C. R. Mason, General Electric Co.

"A Comprehensive Method of Determining the Performance of Distance Relays," J. H. Neher, Philadelphia Electric Co.

"The Ultra-High Speed Reclosing Expulsion Oil Circuit Breaker," A. C. Schwager, Pacific Electric Mfg. Corp.

"Capacitance Control of Voltage Distribution in Multi-Break Breakers," R. C. Van Sickle, Westinghouse Electric & Mfg. Co.

9:00 P.M.—RECEPTION AND INFORMAL DANCE

Wednesday, Sept. 1

9 A.M.—POWER TRANSMISSION, DISTRIBUTION

"Empirical Method of Calculating Corona Loss from High Voltage Transmission Lines," J. S. Carroll, Stanford University, and Mabel MacFerran Rockwell, Consulting Electrical Engineer.

"Distortion of Travelling Waves by Corona," H. H. Skilling, Stanford University.

"Analysis of Series Capacitor Application Problems." J. Butler, C. Concordia, G.E.Co.

2:00 P.M.—STUDENT TECHNICAL SESSION

2 P.M.—ELECTRICAL MACHINERY SESSION

"Tooth-Frequency Eddy-Current Loss," Paul Narbutovskih, Stanford University.

"The Saturated Synchronous Machine," B. L. Robertson, T. A. Rogers, and C. F. Dalziel, University of California.

"Transformer Current and Power Inrushes under Load," E. B. Kurtz, The State University of Iowa.

8 P.M.—ELECTRIC HOUSE HEATING CONFERENCE

"Electric Heating of Residences," C. E. Magnusson, University of Washington.

"Electric Heating of Residences," H. V. Carpenter, State College of Washington.

Thursday, Sept. 2

9 A.M.—COMMUNICATION SESSION WITH I.R.E.

"Magnetic Generation of a Group of Harmonics," Eugene Peterson, J. M. Manley, and L. R. Wrathall, Bell Tel. Labs., Inc.

"Radiotelephone Noise Reduction by Voice Control at Receiver," C. C. Taylor, Bell Telephone Laboratories, Inc.

"The Vodas," S. B. Wright, Bell Labs.

"Transmission Lines at Very High Radio Frequencies," L. E. Reukema, U. of Cal.

"The Developmental Problems and Operating Characteristics of Two New Ultra-high Frequency Triodes," Winfield G. Wagener, R. C. A. Radiotron Co., Camden, N. J.

"High-efficiency Grid Modulated Amplifiers," F. E. Terman, John Woodyard Stanford U.

2:00 P.M.—STUDENT TECHNICAL SESSION

2:00 P.M.—GOLF

8:00 P.M.—BANQUET—PRESENTATIONS

Friday, Sept. 3

COULEE DAM TRIP

Address: "The Coulee Dam Project," Alvin F. Darland, U. S. Bureau of Reclamation.

AUTOMATIC ELECTRIC

INTERCOM. SYSTEMS

Show these handsome, modern handset telephones to your prospects for intercommunication service. They'll go for them in a big way — and your sales will increase accordingly!

These private telephone systems are designed and produced specifically for the high quality, medium price field by one of the world's largest manufacturers of telephone equipment. They represent the last word in snappy, modern appearance, perfect performance and complete reliability.

Complete systems are available in capacities of 2, 6, 10 and 11 stations, with wall or desk type telephones. Write at once for illustrated catalog and discount sheet.

Automatic Electric Intercom. Systems are designed for private service. They cannot be connected with the public telephone system.

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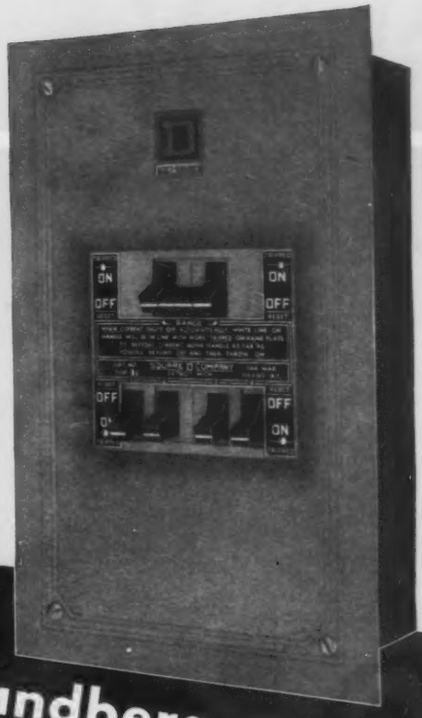

Proof is coming in from all directions that the SQUARE D MULTI-BREAKER brings EXTRA Profits to Contractors

● Read Mr. Strandberg's letter. He was cautious about recommending the Square D Multi-breakeR and it almost cost him a good customer.

Now he knows that his clients appreciate the full comfort of adequate wiring and will pay the price. And no wiring job is up-to-date unless it is automatically protected with Multi-breakeRs.

You can do as Mr. Strandberg did. Use the Square D Multi-breakeR to get bigger and better wiring jobs—installations that will advertise you as an outstanding electrical contractor. More jobs—larger profits!

Square D has sold the idea of fuseless circuit protection through national and trade advertising. This market is ready for you. Ask your wholesaler about the Multi-breakeR advertising campaign, display boards and dealer helps.

E. Strandberg started out this way...

Mr. E.L. Pittenger,
Square D Company,
710 South Third St.,
Milwaukee, Wis.

Dear Mr. Pittenger:

When you first talked with me about Multi-breakeRs, I was naturally interested and bought one. However, the idea that I could sell them on all new wiring jobs did not occur to me until you gave me the thought.

I didn't do much about the Multi-breakeR after I bought the first one because I felt that I would lose out on jobs because of the slight extra cost. You will recall that it was some time after this that I saw you again and you showed me how to take my jobs out of the price class with Multi-breakeR.

And here's the funny thing about my first effort to sell it. Mr. ----- was the man I called on and he came back at me with the story that he had seen the advertisement in the magazine "Time" and was just waiting to see if I was going to offer to sell him a Multi-breakeR for his home and if I had not done so he would have insisted upon the installation of a Multi-breakeR in his home. If I had not been in a position to supply him, he said he would have gone to some other electrical contractor.

So you see that not only have I gotten new oustomers because of the Multi-breakeR, but it prevented me from losing a good customer. You can believe me I am now sold on the fact that I can sell Multi-breakeRs and that a distributing system on a wiring job is not up-to-date unless it is automatically protected with Multi-breakeRs.

Incidentally, Multi-breakeRs are getting me extra profit on my jobs, too.

Yours very truly,

Strandberg Electric Company,

Antigo, Wis. Elmer Strandberg

Square D electrical devices are available through electrical wholesalers everywhere

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

SQUARE D COMPANY CANADA LTD. TORONTO, ONTARIO

CALL IN A SQUARE D MAN

"and the built-in meter is a Weston of course!"

In what better way can your salesmen drive home the standards that typify your equipment, inside and out?

To buyers, a WESTON on the control panel establishes at a glance a conviction of rigid specifications and sound engineering sense. It talks *quality* louder than words.

In addition, WESTON dependability continues to work for you after the equipment is sold. Assuring a true check on the operating conditions, it protects the machine itself, and the reputation of its builder.

Be sure of the full benefits of proper instrumentation by making sure each instrument you build-in is a WESTON. The WESTON engineer in your vicinity will be glad to cooperate on any instrument problem, and aid you in choosing the instruments best suited to your needs . . . Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

Build-in WESTONS

A wide range of WESTON Instruments are now being "built-in" on welders, dryers, plating and other electrochemical equipment, sound recorders and electronic systems, therapeutic and scientific apparatus, and wherever a close check on electrical quantities is vital to operation and control. There is also a WESTON Instrument available for *your* built-in requirements. Let us send full details.

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To FACILITATE KITCHEN TEST work on electric ranges and appliances, Westinghouse Mansfield Works has developed the portable kitchen laboratory. A group of instruments are assembled in a cabinet harmonizing with that of an electric range. The instruments will test any device rated at less than 50

amperes, 125 to 250 volts, 3 wires, and is suitable for operation on 3-wire Edison, 3-wire network, or 2-wire systems. It consists of a voltage regulator, watt meter, and volt meter, connected to each side of the 3-wire supply, with a 3-wire watt-hour meter for measuring energy consumption. Temperatures of the device to be tested are read by means of thermo-couples to a pyrometer. A humidity indicator and room-temperature thermometer are provided.

●

STUDIES OF VERTICAL-SHAFT PUMPS began last month in a newly established laboratory at the University of California. Cooperating in the tests, which are under supervision of Prof. M. P. O'Brien of the Mechanical Engineering Department, are pump manufacturers and two divisions of the College of Agriculture: Agricultural Engineering and Irrigation Investigations. Studies will deal particularly with laboratory and field testing methods, leading toward development of a pump testing code. Manufacturers interested in participating should write to Professor O'Brien.

●

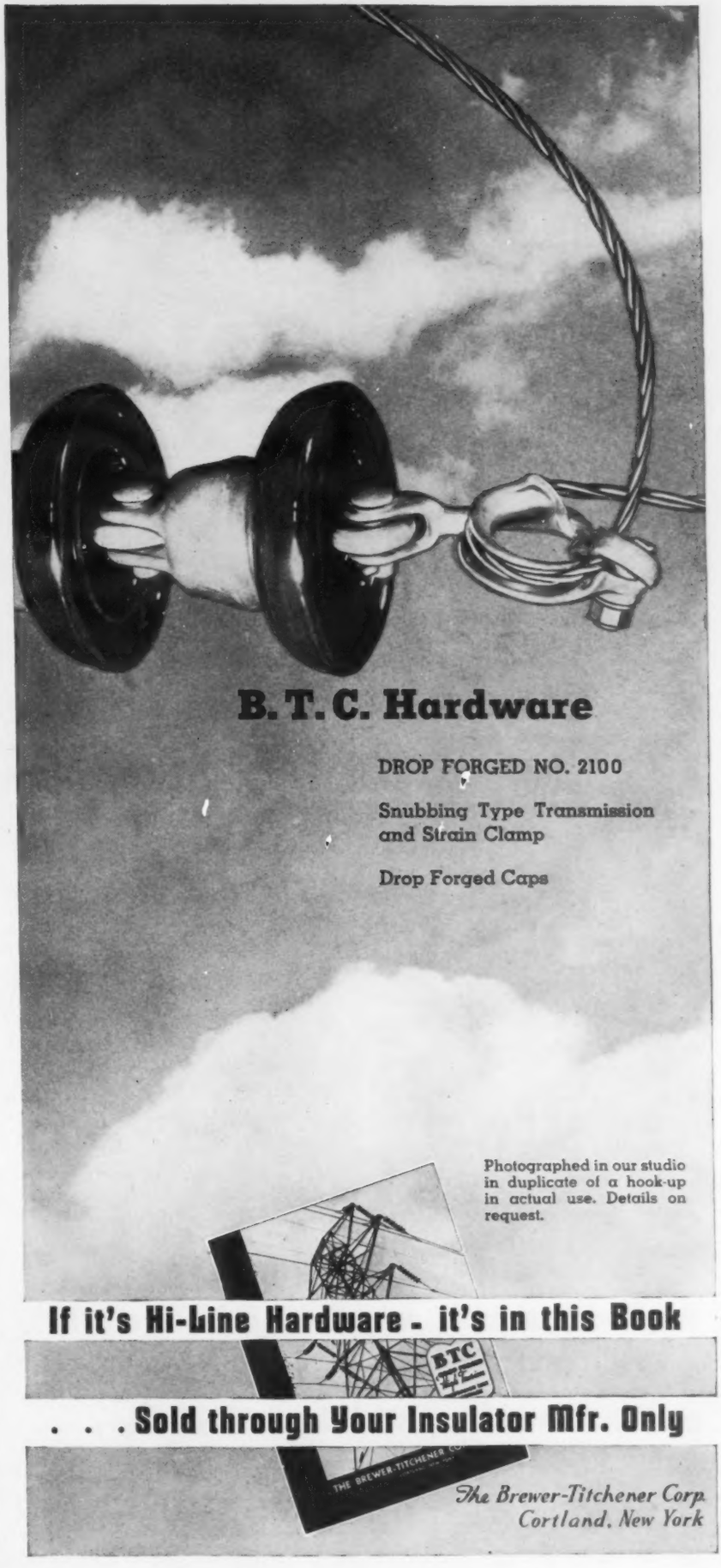
SURVEYS for a proposed 12-mi. 55,000-volt tie line from Balfour to Sumas have been completed by Puget Sound Power & Light Co. Estimated cost is $23,000.

●

FIFTY STAGGERED SODIUM vapor units will be installed on approaches to the new Pattullo Bridge crossing the Fraser River at New Westminster, B.C., by the Mott Electric Co.

●

GENERAL ELECTRIC CO., sole bidder, will install the communication system from the Skagit hydro-electric project to the Seattle offices of City Light for $10,674.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If it's Hi-Line Hardware - it's in this Book
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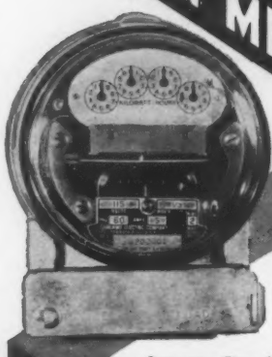
Socket Meter

MODERN METERS



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Federal Activities Concern Bonneville, Boulder, Reclamation Policy

While Congress considers the Bonneville bill and Northwest newspapers discuss qualifications of various candidates for the administrator contemplated therein, Army Engineers approach completition of the project.

At the power house the two 60,000-h.p. Kaplan turbines are installed and the electrical crew is now assembling the 43,200-kw. generators and 4,000-kw. station service unit. Electrical equipment will be ready in November, though it is doubtful if the pool will be raised before December.

On the main spillway dam the installation of the 50-ft. lift gates is about 75 per cent completed. Raising the dam base between five of the eighteen bays is to start this month. The other bays are already poured. Installation navigation lock gates has been commenced by Bethlehem Steel Co. Permanent fishways are near completion.*

●

Bonneville Bill

Special from Electrical West's Washington Bureau.

Understood to represent a compromise between the many pending Bonneville measures was the bill introduced in Congress last month by Chairman Mansfield of the House Rivers and Harbors Committee. It includes a provision referring revision of Boulder Dam power rates to an unspecified federal agency after public hearings. A report is directed this calendar year.

(Boulder provision voted out, see page 63.)

It places responsibility for the operation and maintenance of the entire Bonneville plant with the Army Engineers, who are directed to install additional generating equipment as called for by a Columbia River Administrator to be appointed by the Secretary of the Interior. The administrator will market the power, advised by a three-man committee representing the War and Interior Departments and Federal Power Commission. He will build, buy or condemn distribution facilities and enter into power contracts extending not more than twenty years, with rate revisions at intervals of not more than five years. Preference will be given public distributing agencies, and contracts with private distributors will be cancellable on five years' notice if power concerned is needed by a public body. Contracts may specify resale rates.

Wholesale rate schedules will be drawn up by the administrator, to be effective upon approval by the FPC. New rate schedules will be prepared whenever directed by the commission, and if the administrator fails to submit suitable schedules the commission may determine the effective rate. Rates shall consider (a) widest possible distribution (b) cost of generation and distribution, including amortization and interest. Costs chargeable to power shall be determined by the administrator subject to FPC approval. In determining the interest rate to be charged the Commission shall apply the same rate to all major federal projects. This provision indicates strongly that the administration intends to have the commission regulate all such projects.

●

Revised Reclamation Policy

Special from Electrical West's Washington Bureau.

Members of Congress from Western states realize they confront the need for revising reclamation policy in so far as it contemplates complete repayment in 40 years. Any substantial acreage reclaimed in the future, it is believed, will require some subsidy either directly or through power.

Typical of projcts under consideration is that at Buffalo Rapids on the Yellowstone river, where work is about to begin. Half the construction cost will be met by relief funds. Water users will not be asked to repay that part of the cost. The remaining $800,000 of the cost will be repaid in the customary way over the 40-year period.

●

"Little TVA" Hearings

Special from Electrical West's Washington Bureau.

Hearings on the proposal to set up seven regional authorities to plan development of the country's water resources, following the TVA pattern, started July 15 before the House Committee on Rivers and Harbors. An announcement by Chairman Joseph J. Mansfield of Texas that the committee plans an intensive investigation, with testimony from all federal departments concerned, as well as from private industry, indicated that the hearings will continue for some time. First witness was Representative John E. Rankin of Mississippi, head of the House power bloc, who introduced the companion bill corresponding to the Norris bill in the Senate. The committee also has before it a somewhat similar, but less far-reaching, bill introduced by Chairman Mansfield.*

* The 1937 spring run of Chinook salmon was successfully passed through two temporary ladders, one at each side of the main channel, consisting of a series of weirs creating pools, with a 2-ft. lift between pools, in bays 1 and 18. Although there was an under-water opening in the weirs, most of the Chinook went up the ladders by jumping from pool to pool. Observers estimated from 50 to 100 fish in the air at one time. At the time of writing Blue-back salmon are still running and passing up-stream over the dam without difficulty. Reports of up-stream catches by the commercial fishermen indicate that the dam has not been a barrier to this year's run.

* Electrical West, July, 1937, page 56.

New Boulder Contract

Approved by Secretary of Interior Ickes last month was an interim contract between the Nevada-California Electric Corp. and Boulder Dam, authorizing the company to purchase Boulder power immediately, instead of three years hence. Energy at the regular rate of 1.63 mills firm, 0.5 mills secondary, will be purchased as follows:

Year	Firm Energy kw.-hr.	Secondary Energy kw.-hr.
First	62,854,000	37,146,000
Second	79,933,600	70,166,400
Third	96,744,450	78,255,550

With its power line ready for operation the company will begin using energy generated by Unit A-8 in the Arizona wing of the Boulder powerhouse.

JUNE COLLECTIONS for the sale of Boulder Dam power were $150,000, bringing total return to the government at the close of fiscal 1937 to $1,109,438. Included in this total were $400,000 from Pasadena and $500,000 from Glendale as advance payments on equipment to stop interest. June generation was 81,536,000 kw.-hr. Reservoir storage on July 10 was 15,250,000 acre-ft., half the maximum.

Coulee Bids Expected

Bids for the completion of the Grand Coulee dam probably will be invited in October. This contract involves the placing of nearly 7,000,000 cu.yd. of concrete and is expected to run about $60,000,000. It is believed better bids will be obtained if provision is made for the adjustment of labor cost.

FPC Rate Survey

Trends in residential rates from 1924 to 1936, in cities of more than 50,000 population, are surveyed in a report published last month by the Federal Power Commission. Extracts:

"Material progress is being made in the directon of simpler and more uniform rate schedules . . . Objective plans which offer lower rate to customers who increase their consumption over that of the corresponding month of a previous year appear to be gaining a wider application . . . One of the most interesting features of the 1935 report and of the present edition is the wide differences in charges for similar quantities of electric energy in various cities, often exceeding 100 per cent and occasionally exceeding 200 per cent."

The report points also to general rate decreases and consumption increases throughout the period; the relatively small number of increases since 1924; the fact that largest bills generally received the greatest slashes; the small number of changes in rank of cities from low to high during the period. The report, containing 11 tables and 17 charts plus text, may be obtained from the superintendent of documents, Washington, D.C., for 15c a copy.

A BILL passed by the California State Assembly, similar to the Robinson-Patman Act, was the incentive for the Biddle Trade Bureau, trade organization service company in Los Angeles, to recommend trade-association activity as offering the supervision, coordination of ethics and correction of credit granting needed to conform with the act.

●

Salt River Valley Assn. Contracts for Plant

Contract for furnishing a 7,000-hp. diesel engine and 5,000-kw. generator with incidental equipment was granted by the Salt River Valley Users Assn. last month to the General Machinery Corp. at approximately $420,000. Confirming earlier announcement that it would build its own plant, the association announced location to be adjacent to the present crosscut canal plant near Tempe.

Lin B. Orme, association president, said, "The completion of our contract with the Central Arizona Light and Power Co. for use of its steam plant power one year hence, in no way affects our other contracts with the utility. Our relations are on the friendliest basis."

The Tempe plant, scheduled for operation by May 1938, will include a building large enough to accommodate railroad tracks and cars, with storage capacity for several month's fuel supply. Start of the foundations and building is scheduled this month.

●

Hagerman Plant to Be Ready Next Month

Completion of Idaho Power Co.'s $2,400,000 hydro plant on the Snake River near Hagerman, is scheduled for Sept. 15, according to H. L. Senger, chief engineer, and E. A. Woodhead, construction superintendent. Construction of the 1,600-ft. regulating dam is under way. More than 250 men are at work.

Operation will add 19,400 kw. to the company's installed capacity, will increase the number of company plants within the state to ten. The 30-mi. transmission line to carry energy to Shoshone Falls will be started soon. The new Hagerman plant is to be Idaho's largest single power producer.

●

FRIGIDAIRE DIVISION, General Motors Corporation, preparing for 1938 production, will, within the next few weeks, start a factory enlargement program. It will be the largest since 1926 involving expense of $4,000,000 for additions at Moraine City, Ohio.

LOWER RATES

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ELECTRIC WATER HEATERS

In modern homes everywhere safe, silent THERMADOR Electric Water Heaters are being installed for their economy of operation and long life.

This rapidly increasing use of electricity for water heating has enabled power companies in California, Nevada and Arizona to make important reductions in electric water heating rates.

Such rate reductions stimulate further sales of Thermador Electric Water Heaters—sales which result in added profits for the dealer and lifetime water heating satisfaction for the homeowner.

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About People

Mainwaring Named President Of Northwest Association

W. C. Mainwaring of the B. C. Electric Railway Co., Vancouver, was elected president of the Northwest Electric Light & Power Assn. at its 30th annual meeting at Portland, July 9. He succeeded George M. Gadsby, Utah Power & Light Co. LeRoy A. Grettum, Eastern Oregon Light & Power Co., Baker, was elected vice-president.

Vice-presidents for the several states were elected as follows: Idaho, K. M. Robinson, Idaho Power Co., Boise; Montana, F. W. Bird, The Montana Power Co., Butte; Oregon, A. C. McMicken, Portland General Electric Co., Portland; Utah, P. M. Parry, Utah Power & Light Co., Salt Lake City; Washington, Frank Walsh, Puget Sound Power & Light Co., Bellingham; British Columbia, E. H. Adams, B. C. Electric Railway Co., Vancouver.

W. C. MAINWARING

Elected to the executive committee were: George T. Bragg, Pacific Power & Light Co., Portland; George A. Boring, General Electric Supply Corp., Portland; and Millard Sebern, Fowler Mfg. Co., Portland. J. E. E. Royer, The Washington Water Power Co., Spokane, and the retiring president are held over.

Immediately following the meeting the new president appointed R. W. Lawlor, Northwestern Electric Co., Portland, treasurer; Berkeley Snow of Portland, executive secretary; and the following section chairmen:

Accounting and Business Practise Section, C. E. Gieseker, The Washington Water Power Co., Spokane; Business Development Section, R. E. Gale, Idaho Power Co., Boise; and the Engineering & Operation Section, A. Vilstrup, B. C. Electric Railway Co., Vancouver.

●

C. W. Leihy Appointed To Editorship

C. W. "Brodie" Leihy, engineering editor of ELECTRICAL WEST and Pacific Coast Editor of *Electrical World*, has resigned from these positions to take over the editorship of *Electric Light and Power* with headquarters in Chicago. A native of Portland, Ore., Mr. Leihy graduated in electrical engineering from Oregon State College in 1926 and followed this with the General Electric test course at Schenectady.

After spending two years in the design and commercial departments at Schenectady, he went to the G.E. Seattle office as sales engineer. He joined the McGraw-Hill Pacific Coast organization in 1930. He is a member of the A.I.E.E. and a captain in the U. S. Field Artillery Reserve.

●

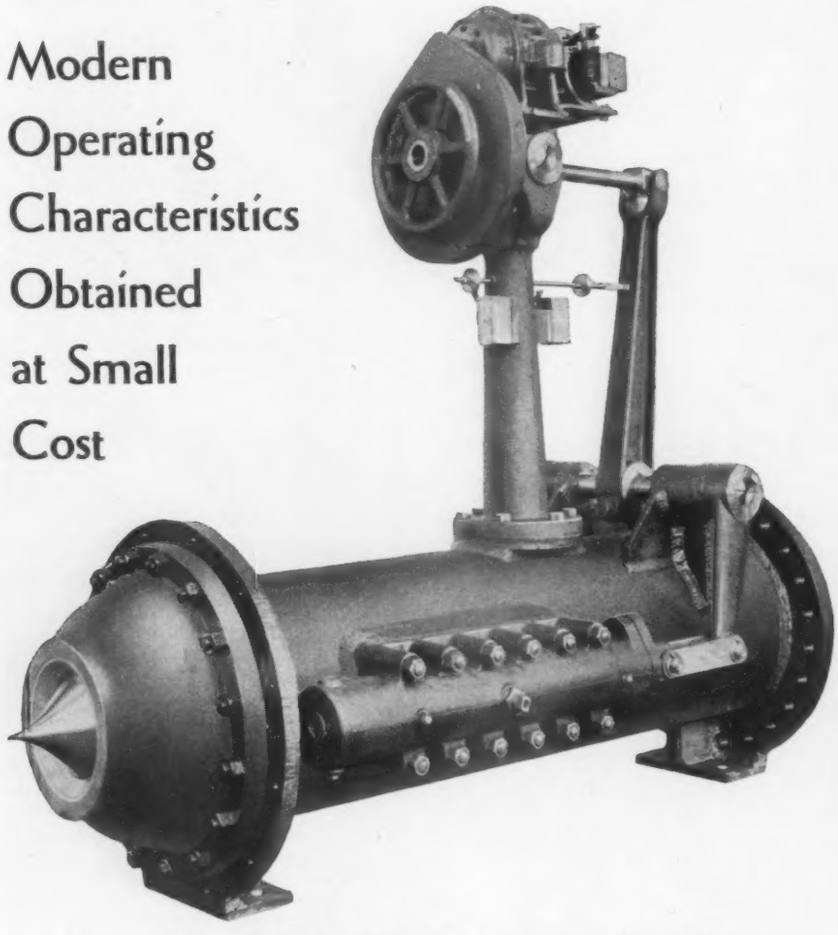
D. L. Wishon Resigns After Long Service

Concluding a career in the electrical industry in the San Joaquin valley which extended over 43 years, D. L. Wishon resigned last month from managership of the Bakersfield district of the San Joaquin Light & Power Corp. He was succeeded by Harold K. Fox, for thirteen years engineer in charge of hydro-electric construction for the company.

Mr. Wishon, a brother of the late A. G. Wishon, joined the Mt. Whitney Power Co. at Visalia in 1894, and became a member of the San Joaquin organization in 1902. He was named manager at Bakersfield in 1918.

Mr. Fox joined the organization in 1919 during the construction of Kerckhoff Dam.

Modern Operating Characteristics Obtained at Small Cost



This modern, high efficiency straight-flow nozzle, together with a runner of latest design, was practically all the hydraulic equipment needed for modernizing a thirty-year-old plant in California. From the standpoint of power output, operating cost, efficiency and safety, the modernized unit is far superior to the original installation, reconstruction costs having been comparatively insignificant.

Further details on this and other rehabilitated plants may be readily secured from Pelton engineers.

The Pelton Water Wheel Company

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PELTON

Van Bokkelen Heads Fair's Electrical Division

Appointed chief of the 1939 Golden Gate International Exposition, Division of Electricity, last month was William R. Van Bokkelen. He succeeds Earle English, who resigned because of the press of private business, but will be retained as a consultant.

Under Mr. Van Bokkelen's supervision will be the installation of wiring and substations that will consume an estimated 40,000,000 kw-hr. during the 288 days of the fair. These include three 9,000-ft. submarine cables which will take power from a pierhead to the 400-acre "Treasure Island" in San Francisco Bay, and a 16,000 kw. substation. General distribution will be through 10 miles of 4,000-volt underground three-phase feeder circuits, 25 miles of street-lighting cable, plus secondary.

Mr. Van Bokkelen was for 18 years electrical engineer and chief engineer of Coast Counties Gas & Electric Co. The past six years he has spent in private practice.

W. R. VAN BOKKELEN

●

GEORGE H. WISTING, assistant general manager, Northwestern Electric Co., Portland, in charge of business development, automatically became president of the Portland Electric Club July 1. He succeeded Verne M. Miller, manager, North Coast Electric Co., who remains on the executive committee. Max I. Mullen, Marwood Co. of Oregon, advanced from second to first vice-president. Other officers remain the same.

●

A. T. BERGERON has been appointed Pacific Coast sales manager for the Miller Co. Richard English has been added to the sales force.

●

A. R. MATSON, Matson Electrical Equipment Co., Oakland, was elected president of the Alameda County Electrical Contractors Assn. at its annual meeting. William Bernhardt, Bradshaw Electric Co., Berkeley, was named vice-president and E. A. Chloupek, California Electric Co., Inc., was made secretary-treasurer again. Appointed to a committee on labor relations were Walter Spencer, Dan Bronson, T. O. Rosenberg, Gus Krolls, Wm. Bernhardt and A. R. Matson.

●

NANCY FINCH, home service director for Utah Power & Light Co., recently became the first woman ever to address the national convention of Edison Electric Institute when she reported at the Chicago meeting on home service operations.

NEW OFFICERS of the American Institute of Electrical Engineers took chairs Aug. 1, headed by W. H. Harrison, assistant vice-president of engineering and operation, American Telephone and Telegraph Co., as president. Two of the vice-presidents are westerners: L. N. McClellan of Denver, and J. P. Jollyman, of San Francisco. Westerners on the board of directors are L. P. Blaisdell, Dallas; C. E. Rogers, Seattle; R. W. Sorensen, Pasadena.

●

J. S. KEENAN, appliance and merchandise department manager of the Canadian General Electric Co., Ltd., made his first visit to Vancouver last month, then attended the Banff convention of the Canadian Electrical Assn.

●

VICTORIA ELECTRICAL ASSN., B. C., at its annual meeting appointed S. J. Halls, B. C. Electric Railway Co., as honorary president, and elected the following officers: R. T. Murphy, president; A. Whiteman, vice-president; A. R. Colby, secretary- treasurer; George A. MacDonald, E. Emery, H. J. Langdon and E. Saunders, executives; and C. H. Ireland and E. Emery, auditors.

●

LOS ANGELES ELECTRIC CLUB, scheduling its next meeting for mid-September, elected the following officers: Cliff Thorburn, President; M. G. Sues, first vice-president; C. E. Houston, second vice-president; J. H. Cunningham, third vice-president; J. J. O'Reilly, secretary-treasurer; Charles S. Chryock, sergeant-at-arms. Executive committee men are R. A. Hopkins, Ross Hartley, E. V. Kane, J. C. Pyle, and A. L. Stone.

●

CORRECTING a news note in the July issue, A. J. "Jimmy" Shaver is manager of the Western States Utilities Co. of Winnemucca, Nev., which is managed by Stone & Webster. Mr. Shaver reports to George A. Campbell of Sierra Pacific Power Co., also a Stone & Webster property.

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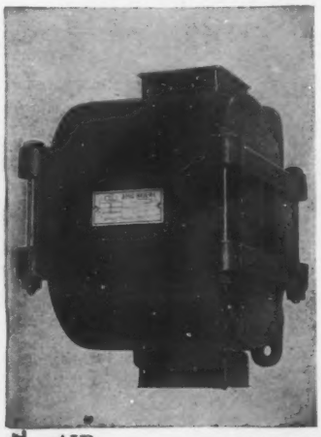

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MAYDWELL & HARTZELL
INCORPORATED
Electrical Engineers and Manufacturers' Representatives
Los Angeles ★ San Francisco

E. E. TUGBY has resigned from the engineering department of the Puget Sound Power & Light Co. at Olympia, Wash., to join the sales staff of the Pacific Electric Manufacturing Co. with headquarters in San Francisco.

●

L. W. THOMPSON, 912 East Third St., Los Angeles, has been appointed southern California and Arizona representative for the Electric Power Equipment Corp., Philadelphia, Pa.

●

STEPHEN C. BACON has been transferred from the Allis-Chalmers Mfg. Co. in Milwaukee to the Seattle staff as sales representative. He is an engineering graduate of the University of Washington.

●

JOHN S. CLARK, P. O. Box 143, Station A, El Paso, Texas, has been appointed representative in eastern Arizona, New Mexico and western Texas for Ward Leonard Electric Co.

●

GEORGE J. WHEAT has been appointed power sales supervisor for the Santa Ana division of Southern California Edison Co., Ltd. He succeeds C. W. Curtiss, transferred to the newly formed Vernon City district. G. L. Blanchard has been named to succeed Mr. Wheat in Covina.

●

PROMOTED from superintendent of power to chief engineer of the Utah Power & Light Co. last month was Lucius B. Fuller, who has been associated with power development in the intermountain territory since 1901. He was superintendent of power for the past seven years. The position of chief engineer was left vacant by the promotion of H. H. Krueger as vice-president of both the power company and the Utah Light & Traction Co.

●

IN PERSONNEL CHANGES, announced last month by Puget Sound Power & Light Co., Seattle, Ed H. Segale, treasurer of the Everett division, was moved to Seattle as special assistant to O. W. Bennett, his place being taken by H. Bryan Johnson of the Seattle office. Henry R. Kruse, sales manager at Everett, became director of merchandise sales and sales promotion at Seattle, his place being taken by Harry A. Arnold of the Seattle sales department.

●

WILLIAM L. BURR has been appointed local agent for Southern California Edison Co., Ltd., in Sierra Madre, succeeding R. C. Copenhaver, who retired after 34 years service. Mr. Burr formerly was senior commercial service man in the Alhambra division.

Inspector Generals

These men head the two groups of inspectors that will meet together in Salt Lake City, Aug. 23-26

President H. V. Dobson of the Southwest Section, I. A. E. I. He is city electrical inspector of Santa Barbara, Calif.

President E. G. S. Pryor of the Northwest Section. He is resident engineer for Underwriters' Laboratories, Inc., at Seattle

●

T. H. CROSBY has been appointed manager of Vancouver, B.C., district for Canadian Westinghouse Co. With the company in Vancouver since 1913, Mr. Crosby takes over the district from John R. Read, who recently was appointed a vice-president.

●

LEONARD PEEL has assumed management of the contracting department of E. J. Peel Electric Co., Ltd., operating in the Kerrisdale area of Vancouver. He is the son of E. J. Peel, pioneer Vancouver electrical contractor-dealer.

●

L. E. BALDWIN has been appointed factory representative in the inter-mountain territory for the Electromaster electric ranges and water heaters. He formerly was superintendent of the dealer coordination department of Utah Power & Light Co.

Inspects State Capitol

Cliff Prudhomme, now chief electrical inspector, Sacramento, succeeding the late Carl Beaton. Mr. Prudhomme was a contractor for many years in Sacramento

●

PHIL BATTELLE, for a number of years managing director of the Retail Furniture Assn. of Southern California, has resigned to assume full charge of the magazine *Western Furniture Retailing*, which he acquired last year from the original publisher. His new headquarters are on the tenth floor of the Western Furniture Exchange and Merchandise Mart, San Francisco. Mr. Battelle's previous publishing experience is reflected in the improved content of the magazine.

●

W. P. MILLS, president of the Sitka Wharf & Power Co. of Sitka, Alaska, visited Seattle last month to complete arrangements for the enlargement of his company's hydroelectric plant. The Star Machinery Co. of Seattle was awarded a $15,000 contract to furnish a water wheel generator unit. The Westinghouse Electric & Manufacturing Co. and the Westinghouse Electric Supply Co. were given orders covering substation and distribution transformers and new transmission line wire and materials. Cost is estimated by the Seattle engineering firm of Hubbell & Waller at $75,000.

●

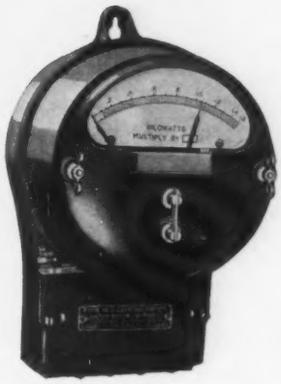
PROMOTION of W. Ray Teele, local agent in charge of the Beverly Hills office, to manager of the newly formed Beverly Hills District of the Southern California Edison Co., Ltd., was announced by W. L. Frost, vice-president.

●

ERNEST C. KIERSTED, special agent of the Idaho Power Co. and editor of the company's Bulletin, died in a Boise hospital June 29, following pneumonia. He had been associated with the company from its formation in 1916, and with predecessor companies from 1907.

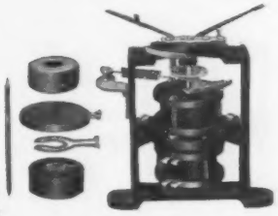
LINCOLN DEMAND METERS

Simple in Construction



TYPE WD

As simple in construction as an ordinary indicating meter. The chief difference is that, the Lincoln Demand Meter is time lagged to a large degree, while an ordinary indicating meter is practically instantaneous.



View of actuating element and parts

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STEEL STRAND MADE TO RIGID SPECIFICATIONS

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About the Trade

Conduit Factory Planned in South

To meet increasing markets on the Pacific Coast, Johns-Manville Products Corp. has acquired option to purchase a 50-acre plot of land in Watson, Los Angeles suburb. Planned to begin immediately is construction of a $1,000,000 factory for the manufacture of Transite pipe and conduit as well as rock wool home insulation. Upon completion, early in 1938, the plant is expected to employ 300 men.

●

GENERAL CONTROLS Co. has purchased a 12-acre site at Allen and Flower Sts., Los Angeles, where it will invest $186,000 in construction of a plant and purchase of equipment for the manufacture of automatic temperature pressure and flow controls for refrigeration, air conditioning, and other uses.

●

BENDIX HOMES APPLIANCES, INC., has announced its entrance into the electrical appliance field with an automatic home laundry machine. According to the new company, its product will be marketed through a national distributor organization built up during the past six months. Officers include Don O. Scott, president, and J. S. Sayre, vice-president in charge of sales. California distributor is the Leo J. Meyberg Co.

●

NEW LOBBY AND SHOW ROOM of the Washington Water Power Co. at Spokane were opened to the public last month. Modernizations, begun last fall, have been extended to all floors except the second, on which work is in progress. Air-condtioning, perforated Celotex ceiling, cork floor covering and black walnut wood finish are included.

●

THE SEATTLE BRANCH of Fairbanks-Morse Co., bidding $295,000, last month secured contract for the construction of a municipal diesel power and distribution system in Coeur d'Alene, Idaho. Construction, however, will await litigation instituted by five Coeur d'Alene citizens, who allege that the plant will be inadequate, according to W. J. McIntosh, manager of the Fairbanks-Morse machinery department. The suit also contends that PWA assistance, expected when voters approved the project, is no longer available.

●

THE NICKERSON MACHINERY Co., 110 W. Second South St., Salt Lake City, is handling motor control equipment of the Allen-Bradley Co., in Utah, Southern Idaho, Western Wyoming.

WESTINGHOUSE Appliance Division, Mansfield, has issued three booklets of interest to dealers. The first, "Modern Home Laundering," to be used with consumers, gives full instructions for home laundering with Westinghouse equipment. The second is "Tasty, Tempting Roaster Recipes" for the Westinghouse electric roaster and broiler-grid. The third is a sales manual for the refrigerator specialist.

●

BUILDING REVENUE with electric water heaters is the hard-hitting broadside released by the National Electric Water-Heating Council last month to utilities, seeking their entry in the national competition to develop the best plan for water-heater promotion. Entrants will compete for a trophy and $1,000 in cash.

●

PARTNERSHIP in the Interior Electric Co., Vernon, B.C., has been dissolved.

Classified Section

- **COST of undisplayed classified ads is 5 cents a word, minimum $1.00 insertion. Box numbers in care of our San Francisco office count as 10 words additional in undisplayed ads.**
- **RATES per column inch of displayed ads is $3.75.**
- **ALL classified ads are payable in advance.**

ELECTRICAL WEST 883 Mission Street San Francisco, Calif.

● LINES WANTED

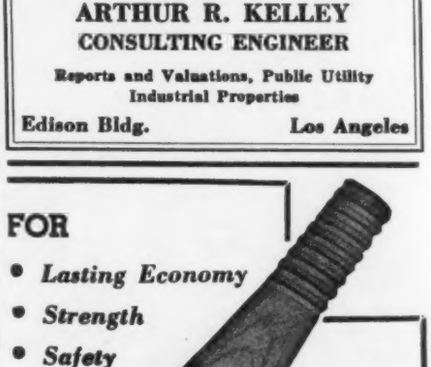
Manufacturer's Agent for eastern Washington and northern Idaho wishes contacts with manufacturers of pole line hardware, wiring devices and supplies. Commission only, closed territory agreements. Address Box 105, Electrical West, 883 Mission St., San Francisco, Calif.

PROFESSIONAL SERVICES

ARTHUR R. KELLEY
CONSULTING ENGINEER
Reports and Valuations, Public Utility Industrial Properties
Edison Bldg. Los Angeles

FOR
- ***Lasting Economy***
- ***Strength***
- ***Safety***

USE



LOCUST PINS
Oak Brackets and Pole Steps

LOCUST PIN CO. FRONT ROYAL, VA.
Maydwell & Hartzell, Inc.
Los Angeles ★ San Francisco

Hubbard's Emeryville Office Is Electric

W. W. Glosser, Pacific Coast vice-president of Hubbard & Co., has every reason to be proud of the company's new Emeryville office building. Modern in every respect, the building is "tops" electrically. In addition to its up-to-date lighting installation, it is completely heated by electricity. It was dedicated with fitting ceremonies early in July

E.E.I. Goes After Commercial Lighting

Plans for a nation-wide drive on the commercial lighting market, with emphasis on customers engaged in retail business, have been developed by the E. E. I. Lighting Sales Committee. A plan book entitled "Plan for Profit Program" has been made available as a guide for the local organization to tie in with the campaign.

Some conception of the commercial lighting market can be gained from examples cited by the plan book. Surveys show that general lighting in the average retail store today does not exceed 6- or 7-ft. candles, whereas effective selling requires lighting at least three times as great. A market research study sponsored by the U. S. Department of Commerce showed that 8,108 retail stores and service establishments in 23 selected communities indicated 66 per cent to be prospects for electrical advertising and at least 29 per cent for better lighting and new lighting fixtures. A national building publication surveyed 165,000 stores and found that 12,000 will be remodeled or modernized during 1937, at an approximate cost of $17,600,000.

A BASKET PICNIC at Bowen Island, under auspices of the Vancouver Electrical Assn., was an occasion for members of the electrical industry in British Columbia late last month. Earle Dunsmuir headed the arrangements committee consisting of Dick Hall, Jack Homersham, Albert Cowsill, Fred Lightfoot, Tom Simmons, Sid Ricketts, and Jack Churchman.

Build DEPENDABLE ECONOMICAL RURAL LINES

USE THESE CHANCE ANCHORS AND FIXTURES

Rural lines must be dependable to be profitable. Too much economy in initial construction may make the line a liability rather than an asset. Insure your investment at a reasonable premium with these Chance Anchors and Guying Fixtures:

1. Wej-Lock anchors in 2, 3 and 4 way
2. Straight Thimbleye
3. Angle Thimbleye bolt
4. Angle Thimbleye
5. No-Wrench screw anchor
6. Angle guy clamp
7. Steel 4-way expanding anchor
8. Straight Thimbleye bolt
9. Chance Cone
10. Chance Rock Anchor
11. Steel 2-way Anchor
12. Thimbleye Anchor rod
13. Thimbleye nuts

A·B·CHANCE CO. Utilities Division
CENTRALIA MISSOURI

Distributed by G. E. Supply Corp.

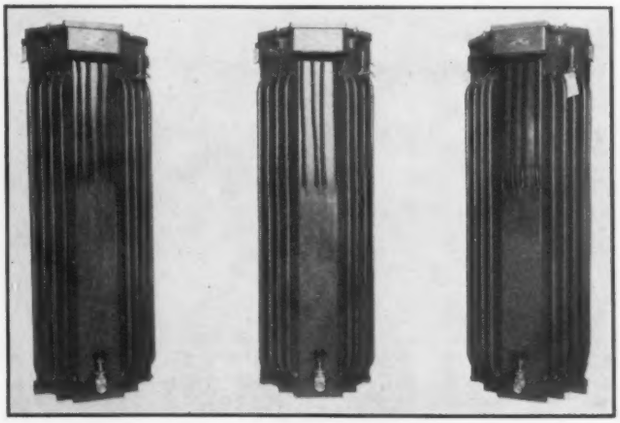
Send for new catalog.

$ Save Your Customers Money! Install Gardner Transformers $

These three Gardner transformers are 150kva 6900/11950 Y volts to 230/460. They were specially built tall and narrow — at no additional charge to purchaser. Their design saved money for the Golden West Brewery of Oakland. Sold by California Electric Company, Ltd., Oakland.

THE ECONOMY and reliability of Gardner transformers will satisfy your customers. Working only through legitimate electrical contractors, whenever possible, Gardner builds transformers to meet the most exacting demands. Take note of three units shown below. Their design saved an Oakland contractor's customer considerable money. See our nearest representative on your transformer requirements.

GARDNER ELECTRIC MANUFACTURING CO.
4227 HOLLIS ST. EMERYVILLE, CALIF.



REPRESENTATIVES:
Geo. E. Honn Co., 420 Market St., San Francisco, Calif.; Utilities Supply Co., 1736 E. 15th St., Los Angeles, Calif.; Industrial Electric Co., 1304 Stewart St., Seattle, Wash.; Modern Electric Co., 37 Richards St., Salt Lake City, Utah; Kranefeld Eng'g Co., 3416 14th Ave., Denver, Colo.

FOR QUICK SERVICE ON RELIABLE PRODUCTS ***Call***

GEO. E. HONN CO.

420 MARKET ST., SAN FRANCISCO, CAL.

Manufacturers Representative for:

TREE TRIMMING EQUIPMENT
- BARTLETT MANUFACTURING CO.

FRICTION AND RUBBER TAPES
- CLIFTON MANUFACTURING CO.

CROMPTON TONG TEST AMMETER
- COLUMBIA ELECTRIC MFG. CO.

PYREX INSULATORS
- CORNING GLASS WORKS
- BREWER-TITCHENER HARDWARE

TRANSFORMERS
- GARDNER ELECTRIC MFG. CO. *Power and Distribution Transformers*
- LEE SKIPWITH & CO., INC. *Niagara Air-Insulator Current Transformers*

CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
- JASPER BLACKBURN PRODUCTS CORP.

CABLE GRIPS
- KELLEMS PRODUCTS, INC.

METERING INSTRUMENTS
- LANDIS & GYR, INC.

NEON MULTIPLE PLUG FUSE
- PACIFIC INDICATOR CO.

FUSES, CUTOUTS, PROTECTIVE DEVICES
- SCHWEITZER & CONRAD, INC.

New nut housing. Locks Anchor firmly on rod. Rod cannot slip thru Anchor when being installed.

EVERSTICK ANCHORS...

Engineers appreciate Everstick features which assure safety, long life and ease of installation in any soil condition. A complete line of 3 types of expanding Anchors and rigid types of Cone Anchors. All sizes and holding capacities. Write for Everstick literature including new folder on Rural Electrification Lines.

EVERSTICK ANCHOR CO.

FAIRFIELD, IOWA

MANUEL JOSEPH has acquired the store formerly occupied by Waxon Bros., 1014 J St., Sacramento. He will handle the G.E. appliance line as did Waxon Bros.

●

GEORGE BELSEY CO., LTD., distributors of G. E. appliances, plan to produce a booklet of their own to supplement the General Electric Co.'s "Companionship" booklet. The Belsey booklet will apply specifically to services offered prospects by the Belsey kitchen planning department on typically southern California homes.

●

VICTORY for the soft ball team of the Seattle Electric Club (22 to 16) was a high spot of the joint picnic with the Tacoma Electric Club, July 17, at Golden's North Lake Resort. Heading the teams were Jake Alles, North Coast Electric Co., Seattle, and Oscar Nelson, Nelson Electric Co., Tacoma. Foot races, swimming contests and dancing were included in the day of entertainment arranged by Nelson, and Grover C. Burke, City Electric & Fixture Co., Seattle, and sponsored by the Washington Electric Club.

●

DISTRIBUTORS NAMED—

Exclusive representatives on the West Coast, appointed Aug. 1 by Hart Mfg. Co., are: Sierra Equipment Corp., 443 S. San Pedro St., Los Angeles, J. D. Lyon, and F. I. DuFrane, 1324 Mission St., San Francisco.

●

PAUL S. EVERLY, 329 Minna St., San Francisco, has been appointed representative in northern California for three manufacturers: Kuhlman Electric Co., transformers; Electric Machinery Mfg. Co., synchronous motors and alternators, and Cornell-Dubilier Corp., capacitors.

●

MOTOR HARDWARE & EQUIPMENT CO., San Diego, Calif., has been appointed distributor for Fairbanks-Morse radios, refrigerators, and home laundry equipment in both San Diego and Imperial Counties.

●

THE MARINE ELECTRIC CO., 195 Fremont St., San Francisco, has been appointed northern California distributor for Copeland household refrigerators, washers and ironers. Frank L. Robinson, who has been placed in charge, is well known in western merchandise. He plans to build a strong dealer organization.

●

YEATS APPLIANCE DOLLY MFG. CO., Long Beach, has appointed Mailler Searles, Inc., Los Angeles, exclusive distributor for their products in Calif., Ore., Wash., Idaho, Nev. and Ariz.

PECK BROS., INC., auto supplies, S. W. 13th and Taylor, Portland, have been appointed distributors for Gibson refrigerators in Oregon and southwestern Washington. The company also distributes Arvin radios.

●

STORES OPENED—

AN ELECTRICAL APPLIANCE BRANCH store has been opened in Kirkland, Wash., under managership of W. M. Patton, by McDougall-Southwick, Seattle department store.

●

RCA VICTOR CO., LTD., recently was registered at Victoria, B. C., as an extra-provincial company authorized to distribute records, radios, etc. British Columbia offices are at 1206 Homer St., Vancouver; head offices at 925 Lenoir St., Montreal, Quebec.

●

STERLING FURNITURE & APPLIANCE CO. is opening a branch appliance store in Sugar House, Utah, with Huey L. Peterson, manager. Further stores on an expansion program are being planned.

●

B. C. REFRIGERATOR SERVICE, LTD., has incorporated as an electrical dealer at 525 Seymour St., Vancouver, B.C.

●

CLARK & NIXON ELECTRICAL CO., Victoria, B. C., electrical contracting and jobbing firm, has opened an appliance store at 833 Yates St., specializing in sales and service of Northern Electric radios and products. A novel feature is a dark room in which lighting fixtures may be judged under night-time conditions. Among items handled are Gurney electric ranges, A.B.C. electric washers and ironers, Leonard refrigerators.

●

MOVED—

THE PACIFIC ELECTRIC MFG. CORP., Northwest district office to 1006 Securities Bldg., Third and Stewart Sts., Seattle.

●

G. R. PIZARRO, Norge refrigerator representative at Los Angeles, to the Signal Oil Building, Room 405, 811 W. Seventh St.

●

S. P. LARSEN, sales engineer for Hubbard & Co., to 448 South Hill St., Los Angeles.

●

H. J. SAYER & CO., Vancouver, B. C., to 424 Pacific Bldg., 744 W. Hastings St.

●

G. W. FIRTH ELECTRIC, Vancouver, B. C., contracting firm, to the F. M. Beatty Bldg., 1575 W. 5th Ave.

●

FELT RADIO CO. to a new store at 245 S. State St., Salt Lake City.

●

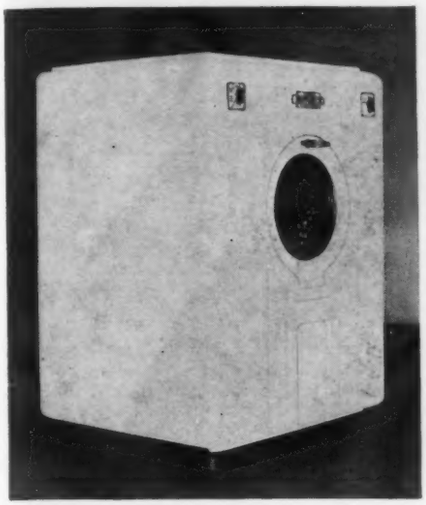
ART ELECTRICAL ENGINEERS, LTD., to new premises at 632 Howe St., Vancouver, B. C.

●

HEADQUARTERS of the Vancouver (B. C.) Electrical Assn. from Howe St. to 535 Homer St., in the Victory Hall Building.

New Products

Automatic Washer



A radical departure from conventional washing machine design is the automatic home laundry announced by Bendix Home Appliances, Inc. The unit measures 20½x24⅛ in. by 35⅛ in. high. It is contained in a rectangular cabinet with a vertical port at the front for placing and removing clothes. Two controls at the front pre-set water temperature and washing time. After clothes are placed, the machine washes from one to 20 min. as set, drains, sprays, tumbles, spins, rinses 4 min. in new water, then repeats the spray-tumble-spin cycle—all automatically. The machine accommodates 9 lbs. of clothes, holds 5 to 7 gal. of water.

●

Branch-Circuit Breakers

General Electric Co. has announced a new line of branch-circuit circuit breakers, single pole only, in 15, 20, 25, 30 and 35 amp. capacities, 125 volts, a.c. or d.c. Their tamper-proof mechanism is sealed in and said to be unaffected by vibration. The trip-free mechanism cannot be blocked by the handle when the circuit is actually overloaded.

●

Wire Skinner

A wire skinner, called Handi-Grip, weighing 3 oz., has been introduced by Ideal Commutator Dresser Co. An aluminum handle hooks around the fingers to give pulling grip. The back is grooved to supply a means of straightening sharp bends. Blades are of hard tool steel with cutting edges hollowed in the center and are removable for resharpening.

●

Outdoor Outlet

Especially designed for gardens is a series of outdoor outlets called "Electric Spigot," manufactured by the National Electric Products Corp. Around the outlet is a weather-proof hood and cover, hinged with a heavy spring. It is said to keep out rain, snow, and ice but can be lifted with the flick of a finger.

●

Motor Starter

Allis-Chalmers Mfg. Co. has announced a new across-the-line air motor-starter equipped with enclosing chambers called "Ruptors" for confining and depotentiating the arc. It is furnished for 7½ hp. at 440 and 550 volts, 5 hp. at 220 volts, and 3 hp. at 110 volts. It is of unit construction, pole units with individual molded bases being mounted on a steel chassis. The pilot circuit is isolated from the motor circuit, permitting a separate control voltage for push button circuit where necessary. The arc depotentiating chambers are said to greatly increase the interrupting ability of the contact.

●

Unit Dishwasher

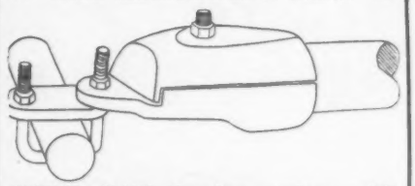
Electric dishwasher, sink basin and work surfaces are combined in the cabinet type electric dishwasher developed by Westinghouse Electric and Mfg. Co. The all-steel cabinet, finished in white dulux, requires but 48x25 in. of floor space, and is designed either to replace an old sink or to complete the all-electric kitchen in the new home. Capacity is for 57 dishes, including glasses, and 45 pieces of silverware. In addition to the complete sink unit a 24 in. unit containing the dish tank and washing mechanism only is being made available.

●

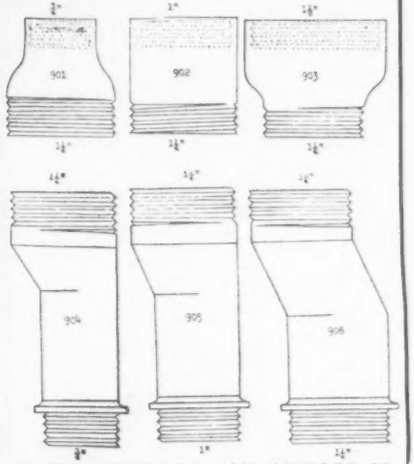
Continuous Outlet

Plugmold is the name given by the Wiremold Co. to its continuous outlet system, which consists of a raceway with plug receptacles and other fittings. The raceway has a channel for surface or inset mountings, and a cover which snaps into the channel forming a flat top. The cover is scored in 3-in. sections corresponding in length to the receptacles. By breaking off scored sections receptacles may be inserted where and when needed. Receptacles set flush with cover. The raceway has a capacity for six No. 12 wires and knockouts every 8 in. for ½-in. conduit or armored cable.

★ *The* HARTMAN *Line* ★



GROUND CLAMP—Threadless, receives conduit at any angle. For rigid or thin wall conduit. U-bolts from 1¼ inches to 6 inches.
REDUCING ADAPTERS—Adaptable to the Westinghouse meter socket; 904-5-6 is an eccentric type which by turning, will line up the meter socket with the switch, making a flush mounted job.



B. HARTMAN 168 SUNSET ST. LONG BEACH, CAL.

HEMINGRAY Glass INSULATORS

for primary and secondary insulation service and rural line needs.

Brass-bushed for great strength, perfect threads and full protection against pin expansion.

Hemingray provides many advantages: greater mechanical strength . . . sustained dielectric strength . . . unaffected by sudden temperature changes . . . withstands maximum insulator pin expansion . . . never ages or deteriorates . . . all surfaces impervious to moisture . . . tougher—withstands rough handling . . . clear and flawless for easy inspection.

Available in all styles . . . clear or brown glass . . . ratings up to 15,000 volts. Write for samples.
Owens-Illinois Glass Company . . . Muncie, Indiana.

Maintenance Costs Are Reduced

Where S & C Links are Used

S & C Fuse Links cut maintenance costs, stop needless service trips and outages because they blow ONLY in case of system trouble, apparatus failure, or insulator flashovers. They maintain original time-current characteristics (no soldered joints).

S & C Links are designed on the same principle as the fuse element in S & C Liquid Fuses that have given you such satisfactory protection on your power stations.

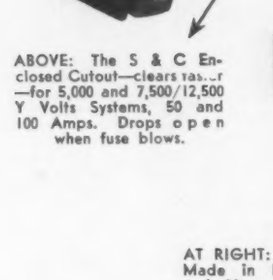
You Can Apply S&C Fuse Links on Your Small Transformers as Low as 1 Amp.

You don't need high capacity links to get mechanical strength. The 1 Amp. S & C Fuse Link is the strongest link made and it will fit all types of cutouts. . . . It is the ONLY Universal Link.

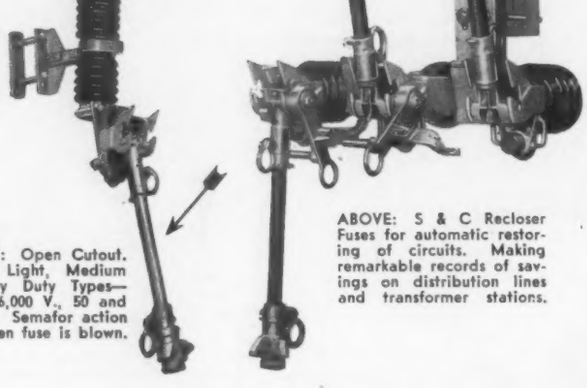
Let us mail our treatise on "Fuse Links"—Bulletin 218.

SCHWEITZER & CONRAD, Inc.
4435 RAVENSWOOD AVENUE . . . CHICAGO, ILLINOIS
Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Can.

WESTERN REPRESENTATIVES
San Francisco: Geo. E. Honn, 420 Market Street. Seattle: T. S. Wood, 220 Ninth Street, North.
Los Angeles: Farnham & Cunningham, Edison Bldg. Salt Lake City: Riter Engineering Co., Kearns Bldg



ABOVE: The S & C Enclosed Cutout—clears fa...r —for 5,000 and 7,500/12,500 Y Volts Systems, 50 and 100 Amps. Drops open when fuse blows.



AT RIGHT: Open Cutout. Made in Light, Medium and Heavy Duty Types—5,000 to 46,000 V., 50 and 100 Amps. Semafor action signals when fuse is blown.

ABOVE: S & C Recloser Fuses for automatic restoring of circuits. Making remarkable records of savings on distribution lines and transformer stations.

Trade Literature

Free to you . . . Any of these instructive bulletins . . . Address a post card to ELECTRICAL WEST 883 Mission St., San Francisco, Calif. . . . drop it in the next mail.

CIRCUIT BREAKERS for office buildings, industrials, and power stations; description, illustrations of construction and operation, tripping characteristics and interrupting rating; accessories, dimensions, specifications. General Electric Co.

ALTERNATOR VOLTAGE REGULATORS, electronic automatic, description of theory, illustrations and circuit diagrams. Ward Leonard Electric Co.

NON-METALLIC SHEATHED CABLE, numerous simple diagrams and descriptions of installation according to code regulations; specification for the Durax line. Anaconda Wire and Cable Co.

DETACHABLE INSTRUMENTS; applications, construction details, accuracy and permanence of calibration, performance characteristics, wiring diagrams. Westinghouse Electric & Manufacturing Co.

SPLICES AND TAPES, a booklet covering such subjects as "The Importance of a Perfect Splice", "Requirements for a Splicing Compound", "Requirements for Adhesive Tape", and "Instructions for Joining". The Okonite Co.

SPEED MEASURING INSTRUMENTS, Tachometers, recording instruments and Vibrating-Reed Tachometers, description, operation, direction and accurate ratings. James G. Biddle Co.

ELECTRIC EELS, brief, interesting description of how these fish are being used for experimental purposes. The Electric Storage Battery Co.

MERCURY LIGHT, Cooper-Hewitt horizontal type, describes improvements, gives specifications and engineering data for computing spacing and layout. General Electric Vapor Lamp Co.

BUSBAR distribution equipment for industrial plants, commercial buildings, etc., installations illustrated, standard equipment, fittings, and plug-in devices described and illustrated. Bull Dog Electric Products Co.

MERCURY TUBE RELAYS AND SWITCHES, described and illustrated with photographs and diagrams. Hart Mfg. Co.

SAFETY AND METER SWITCHES; fused cabinets, panel board and similar equipment are catalogued. The Square D Co.

INDUSTRIAL AND COMMERCIAL LIGHTING equipment illustrated and specified. Smoot-Holman Co.

MOTORS, d.c., 1 to 300 hp.; slip ring, 1 to 350 hp.; illustrations and general description. Century Electric Co.

SAFETY AND METER SWITCHES, switch centers, etc., condensed catalogue. Bull Dog Electric Products Co.

HIGH-POWERED PUBLIC ADDRESS equipment, general description and typical installation. Western Electric Co.

●

AIR CONDITIONING EQUIPMENT for industry, business, and home; illustrations, diagrams, and specifications for complete line. Carrier Corp.

WIRES AND CABLES for all occupancies and types of conditions; brief description and table of type used according to requirements. Anaconda Wire and Cable Co.

●

AUXILIARY RELAYS, a.c. and d.c., double-pole, brief description of construction and models available. General Electric Co.

FIRE ALARM SYSTEMS, equipment illustrated and described, circuit diagrams. S. H. Couch Co., Inc.

●

THE ALUMINUM COOKING UTENSIL CO. has announced that the name of its new electric range tea-kettle will be changed from Speedster to the Wear-Ever Hustler.

WHERE TO BUY IT IN THE WEST

FOR SMOOTH OPERATION

Keep your commutators and rings true with an

IDEAL PRECISION GRINDER

No disassembling. 10 days free trial.

Write for facts.

IDEAL COMMUTATOR DRESSER CO.
1042 Park Ave. Sycamore, Ill.

Air Conditioning
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Norge Division, Borg-Warner Corp.

Ammeters and Voltmeters
Ferranti Elec., Inc.
General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instr. Corp.

Anchors, Guy
A. B. Chance Co.
Everstick Anchor Co.
Hubbard & Co.
James R. Kearney Corp.
W. N. Matthews Corp.

Anchor and Guy Rods
A. B. Chance Co.
General Elec. Co.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Appliances, Household
Chicago Flexible Shaft Co.
Easy Washing Machine Corp.
Edison Gen. Elec. Appliance Co., Inc.
Frigidaire Division
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Division
Leonard Division
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
National Enameling & Stamping Co.
Noblitt-Sparks Industries, Inc.
Norge Division
Standard Elec. Stove Co.
The Silex Co.
Thermador Elec'l Mfg. Co.
Wesix Elec. Heater Co.
Westinghouse Elec. Supply Co.
The Woolwine-Norris Corp.

Belts, Safety Straps, Pole Climbers
Western Hardware & Tool Co.

Boxes
General Cable Corp.
General Elec. Co.
Superior Switchboard & Devices Co.

Brackets, Wood
Locust Pin Co.

Breakers
Air Circuit Breakers
Electric Material Co.
General Elec. Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Oil Circuit Breakers
Allis-Chalmers Mfg. Co.
Delta-Star Electric Co.
Electric Material Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.
Line Material Co.
Pacific Elec. Mfg. Corp.

Buses
Aluminum Co. of America

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Hazard Ins. Wire Works
Indiana Steel & Wire Co.
Maydwell & Hartzell, Inc.
National Elec. Products Corp.
The Okonite Co.
Okonite-Callender Cable Co.
Providence Insulated Wire Co.
Rockbestos Products Corp.
John A. Roebling's Sons Co.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.

Carbon Products
National Carbon Co., Inc.

Chimes
Square D Co.

Clamps, Ground
B. Hartman
Reliable Elec. Co.

Clocks, Program
Tork Clock Co., Inc.

Coffee Makers
The Silex Co.

Coil Winding
Jeffries Transformer Co.

Commutator Dressers
Ideal Commutator Dresser Co.

Compounds, Insulating
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John C. Dolph Co.
General Cable Corp.
General Elec. Co.
Irvington Varnish & Insulator Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Flexible Metallic
General Elec. Co.
Wiremold Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

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Burndy Eng'g Co.
Electric Power Equip. Corp.
G & W Elec. Specialty Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Reliable Elec. Co.
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Allis-Chalmers Mfg. Co.
Betts & Betts Corp.
General Elec. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

Cutouts
G & W Elec. Specialty Co.
General Elec. Co.
James R. Kearney Corp.
Line Material Co.
W. N. Matthews Corp.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
G & W Elec. Specialty Co.
General Elec. Co.
Hubbard & Co.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.
St. Louis Malleable Casting Co.
Superior Switchboard & Devices Co.

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General Elec. Co.
John A. Roebling's Sons Co.

Enclosures, Meter and Instrument
Superior Switchboard & Devices Co.

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Kisco Co., Inc.
Smallcomb Elec. Co.

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.
B. Hartman
Killark Elec. Mfg. Co.

Fittings, Insulator
Brewer-Titchener Corp.

Fixtures, Lighting
Benjamin Elec. Mfg. Co.
Curtis Lighting, Inc.
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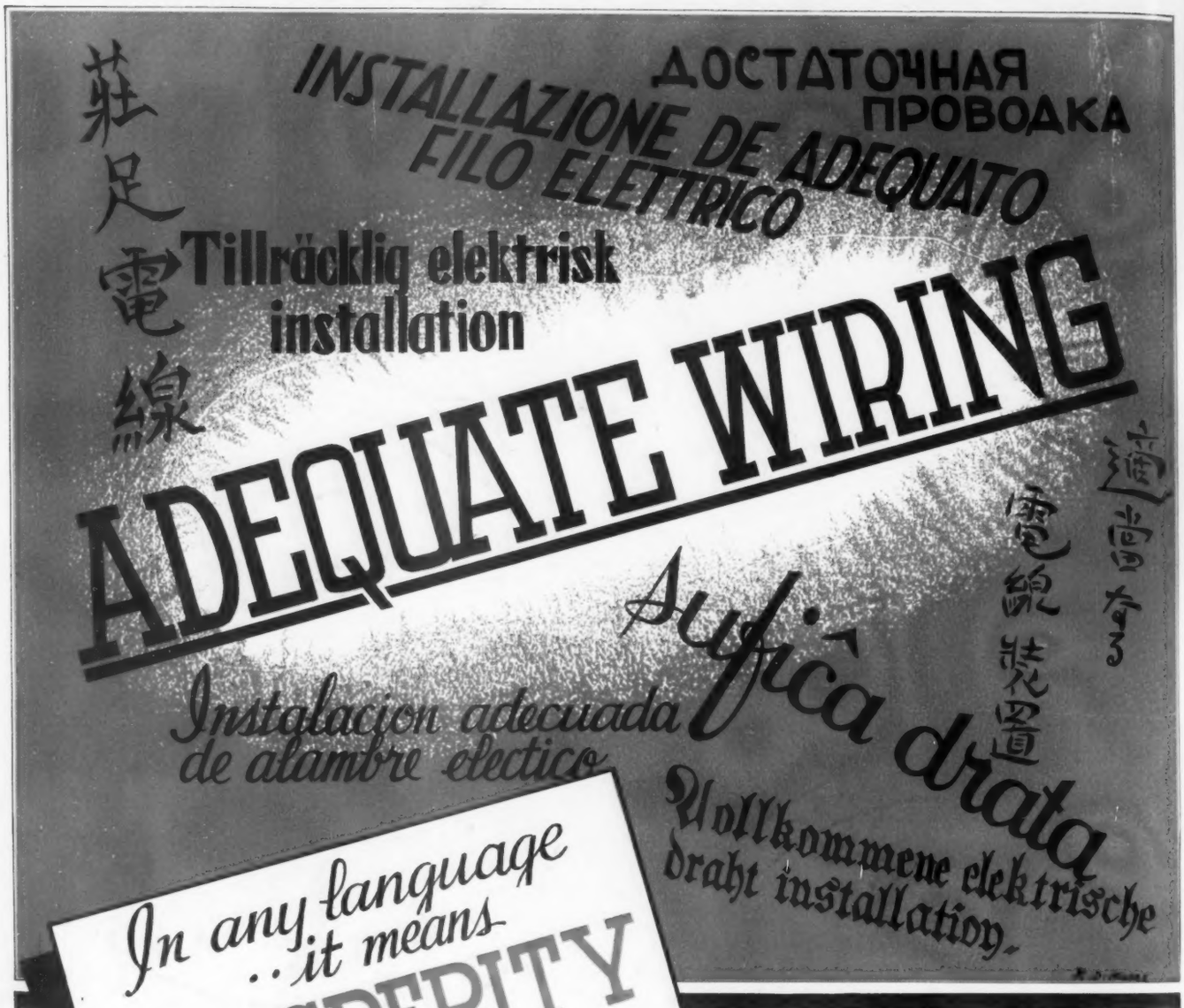

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